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THE SUBGENUS *STEGOMYIA* OF *AEDES* IN THE AFROTROPICAL REGION. II. THE *DENDROPHILUS* GROUP OF SPECIES (DIPTERA: CULICIDAE)

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THE SUBGENUS *STEGOMYIA* OF *AEDES* IN THE AFROTROPICAL REGION II. THE *DENDROPHILUS* GROUP OF SPECIES (DIPTERA: CULICIDAE)[1]

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ABSTRACT. The *dendrophilus* group of the subgenus *Stegomyia* Theobald, genus *Aedes* Meigen, is characterized and diagnosed. Keys to the identification of species are provided. Information on the present status of the *dendrophilus* group of species is summarized. Four new species: *Aedes hansfordi*, *muroafcete*, *njombiensis* and *segermanae* are recognized. One subspecies, *kenyae* van Someren is elevated to specific status. A lectotype is designated for *Aedes deboeri* Edwards.

INTRODUCTION

This paper is part of a revision of the medically important subgenus *Stegomyia* Theobald (genus *Aedes* Meigen) from the Afrotropical Region. African species of *Stegomyia* have been implicated as natural hosts, vectors, and/or reservoirs of eight viruses, six of which cause human illness (Chikungunya, dengue 1 and 2, Dugbe, Rift Valley fever, yellow fever and Zika). Chikungunya, dengue and yellow fever are the most important arboviruses associated with *Stegomyia as* Huang (1990) has already noted.

Despite their medical importance, published records on African *Stegomyia* are superficial and inadequate, and it is extremely difficult to accurately identify specimens that are critically needed for mosquito surveys, virus isolation studies, and epidemiological studies. It is evident that current taxonomic knowledge of these taxa is extremely limited and confused, and reliable keys for identifying species are unavailable (Huang, 1979, 1981, 1986a, 1986b, 1988a, 1988b). Huang (1990) has pointed out that revisionary work on the Afrotropical fauna of this subgenus is badly needed. This is due not only to an increase in the number of known species and subspecies, but also because earlier descriptions are inadequate.

The *dendrophilus* group of species is the most dominant and complex in the African *Stegomyia* as indicated by the number of species and variety of types. Huang (1994) described *Aedes mattinglyorum*, which is sympatric with *Aedes dendrophilus* Edwards, and pointed out again that closely similar *Stegomyia* species are frequently found in the same larval habitat. This paper clarifies the taxonomic status of *Aedes bambusae kenyae* van Someren, resolves the taxonomic problems relating to the *dendrophilus*, *demeilloni* and *keniensis* species complexes and

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provides a guide with keys and illustrations for identification of species and also offers a more natural system of classification.

Due to the complexity and highly variable nature of the group, this study has been hindered by the lack of progeny rearings from single females of certain species and by the lack of individually reared, associated specimens from East and Central Africa.

Fourteen species of *Stegomyia*, of which 4 are new, are recognized in the *dendrophilus* group. The known stages of the 14 species of the *dendrophilus* group are described or redescribed and important characters are illustrated. Keys to the identification of species are provided. Information on the present status of the *dendrophilus* group and its distribution are summarized in appendices I and II. Information on type data, distribution, bionomics, medical importance and a taxonomic discussion of each species is presented.

MATERIALS AND METHODS

This study is based on specimens accumulated by the Medical Entomology Project (MEP) and the Systematics of *Aedes* Mosquitoes Project (SAMP), Department of Entomology, National Museum of Natural History, Smithsonian Institution, and upon specimens that were borrowed from individuals and institutions mentioned in the acknowledgments section. All primary types that are pertinent to taxa in this paper have been studied.

Distributional records are listed in the following order and format: current country (capital letters), administrative division, where known (italics), and place name (first letter capitalized). Place names that could not be located in the gazetteers available are spelled according to the labels on the specimens.

The terminology follows that of Harbach and Knight (1980, 1982), with the exception of "tarsal claws," which is retained for "ungues." The venation terms follow those of Belkin (1962).

An asterisk (*) following the abbreviations used (M = male, F = female, P = pupa, L = larva and E = egg), indicates that all or some portion of that sex or stage is illustrated.

CHARACTERIZATION OF THE *AEDES (STEGOMYIA) DENDROPHILUS* GROUP

DIAGNOSIS. The *dendrophilus* group can be distinguished from other congeners of *Stegomyia* by the following combination of characters: (1) maxillary palpi with white scales; (2) scutum with dorsocentral setae; (3) scutum with a distinct patch of broader crescent-shaped white or yellow scales on fossal area; (4) subspiracular area with broad white scales; (5) postspiracular area without scales; (6) paratergite with broad white scales; (7) scutellum with broad white scales on all lobes; (8) white knee-spot absent on forefemur, present at least on midfemur; (9) midfemur without a large, median white spot on anterior surface; (10) hindtarsus with a basal white band at least on tarsomeres 1 and 2, and tarsomere 3 with or without basal white band.

PUPA and LARVA. Group characters not evident.

DISTRIBUTION. The *dendrophilus* group is known only from the Afrotropical Region. It is found from western Kenya in the north; through Uganda, Zaire, Central African Republic to southwest Cameroon in the west; through Burkina Faso to Senegal in the north-west; from Sierra Leone in the west; through, Ivory Coast, Ghana, to Nigeria and Equatorial Guinea (Fernando Po) in the west; to Angola in the southwest; through Nairobi Area, to Coast

of Kenya in the northeast; to Tanzania in the east; through Zambia, Botswana, Zimbabwe and Mozambique to South Africa in the south. It is absent from Madagascar.

TAXONOMIC DISCUSSION. The *dendrophilus* group contains 14 species: *dendrophilus* Edwards, 1921 from Ghana, *masseyi* Edwards, 1923 from Zaire, *deboeri* Edwards, 1926 from Kenya, *bambusae* Edwards, 1935 from Uganda, *demeilloni* Edwards, 1936 from South Africa, *amaltheus* de Meillon and Lavoipierre, 1944 from Zambia, *keniensis* van Someren, 1946a from Kenya, *kenyae* van Someren, 1946b from Kenya; *heischi* van Someren, 1951 from Kenya, *mattinglyorum* Huang, 1994 from Sierra Leone, and 4 new species, *hansfordi* from South Africa, *muroafcete* from Zaire, *njombiensis* from Tanzania and *segermanae* from South Africa.

Edwards (1932) divided the subgenus *Stegomyia* Theobald into four groups, which he designated A, B, C and D. *Aedes (Stegomyia) amaltheus* was described by de Meillon and Lavoipierre (1944) from Livingstone, Zambia (as Northern Rhodesia). Mattingly (1952, 1953) stated the difficulty of fitting it into Edwards' (1932) system as this species possesses mesonotal markings typical of Edwards' Group A and male terminalia of the type found in his Groups B and C, and pointed out the need for a new system of grouping. Mattingly (1965) began a revision of the main groups of the subgenus *Stegomyia* Theobald as defined by Edwards (1932) and summarized the characteristics of the species groups (A, B and D) and subgroups. He recognized 3 subgroups in Group B (*w-albus* group) and assigned *amaltheus* to his subgroup B_3 (*Ae. amaltheus* subgroup). Huang (1974) transferred *amaltheus* from Group B (Mattingly's *Ae. amaltheus* subgroup) to Group A (*aegypti* group) on the basis of a critical examination of this species (male and female) and comparing it with other members of Groups A, B and C.

Mattingly (1965) subdivided Group A into 3 subgroups known as Subgroup A_1 (*Ae. aegypti* subgroup), Subgroup A_2 (*Ae. africanus* subgroup) and Subgroup A_3 (*Ae. chemulpoensis* subgroup). In "Subgroup A_1 (*Ae. aegypti* subgroup)" he included 28 species from the Mascarenes and Africa. *Aedes bambusae, deboeri, demeilloni, dendrophilus, heischi, keniensis* and *masseyi* were assigned by Mattingly (1965: 22) to his Subgroup A_1.

Aedes (Stegomyia) kenyae van Someren (1946b: 2) was originally described as a subspecies of *bambusae* from Kaimosi, Kenya. Mattingly (1953: 14) stated that it seems more reasonable to regard it as a subspecies of *deboeri* than of *bambusae*. However, it is clearly a distinct species. It shows resemblances to *bambusae* (in the scutal and tarsal markings) and to *deboeri* (in the well-developed knee-spots on both mid- and hindfemora). Differences between the adults of *kenyae* and *bambusae*, and the adults of *kenyae* and *deboeri,* are slight but apparently constant. The larval differences from both *bambusae* and *deboeri* are striking. Based on the discovery that the male genitalia of *kenyae* differ from both *bambusae* and *deboeri* by the claspette, which has the distal expanded portion square in dorsal aspect (narrows towards apicolateral angle, with basolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 3 strong, basally widened spine-like setae on the apicomesal angle (see Fig. 16B, holotype male genitalia slide, SAMP Acc. 1587, 93/105). I have here elevated *kenyae* to specific status.

A new species, *Aedes muroafcete*, from Mt. Karisimwa, Kivu, Zaire, is recognized. The new species, *muroafcete*, is most closely related and similar to *bambusae*, and I consider *muroafcete* to be the sister species of *bambusae.*

Two new species: *Aedes hansfordi*, from Eshowe, South Africa, and *Aedes segermanae*, from Port St. Johns, South Africa, are recognized. *Aedes hansfordi* has been collected with *demeilloni* from bamboo pots (MEP Acc. 806, #105, #110, #114) that were placed on trees in Hlinza Forest, in Eshowe, South Africa. *Aedes segermanae* has been found in association with *demeilloni* from leaf axils of *Dracaena hookeriana* (MEP Acc. 801, No. 6862) in Melville, Natal,

South Africa. Both *hansfordi* and *segermanae* were being mistaken for *demeilloni,* and *hansfordi* was also being mistaken for *dendrophilus* by Muspratt (1956).

The name *Aedes dendrophilus* Edwards has caused considerable confusion and has often been misused. *Aedes mattinglyorum* Huang, which is microsympatric with *dendrophilus*, was mistaken for *dendrophilus* by Edwards (1941), and the new species, *hansfordi* from Eshowe, South Africa, was also mistaken for *dendrophilus* by Muspratt (1956), and others. Mattingly (1952: 240) stated: "A careful comparative study reveals that Edwards's type series of *Aedes demeilloni* from Eshowe, Zululand, contains a specimen of *dendrophilus*." (The specimen from Eshowe, Zululand is not *dendrophilus*, but is the new species, *hansfordi*).

Edwards (1936) described *Aedes (Stegomyia) deboeri* var. *demeilloni* from Eshowe, Zululand, South Africa. Later, Edwards (1941) treated it as a subspecies of *deboeri.* Mattingly (1953: 8) considered that *demeilloni* is a distinct species and elevated it to specific status. Due to the inadequate descriptions and confusion of this species with *dendrophilus* by Edwards (1941), the identity of this species has caused considerable confusion as shown in Smithburn and Haddow (1946), van Someren (1946a), Haddow et al. (1947), and Smithburn et al. (1948).

In addition, a new species, *Aedes njombiensis*, from Njombe, Tanzania (as Tanganyika), is recognized. The collection of *keniensis* and *njombiensis* from the same area, Nairobi, Kenya, suggests that the 2 species are specifically distinct. *Aedes njombiensis* combines some of the features of *keniensis* and *masseyi.* Difference between the adults of *njombiensis* and *keniensis*, and the adults of *njombiensis* and *masseyi*, are slight but apparently constant. These species form a complex of closely related and very similar mosquitoes within the *dendrophilus* group.

Aedes amaltheus appears to be a member of the *dendrophilus* group. It shows resemblances to both *keniensis* and *masseyi.* The relationship to *masseyi* is discussed below under that species.

Based on the present collection data, all members of the *dendrophilus* group, except *dendrophilus* and *mattinglyorum* from western Africa, occur in eastern Africa while *hansfordi* also occur in western Africa.

The *dendrophilus* group shows the strongest affinities with the *poweri* group but can be distinguished easily from the latter by the absence of a large, white spot on the anterior surface of the midfemur.

The *dendrophilus* group is well marked in the adult stage. The adult shares many characteristics of the *poweri* group in scutal and pleural markings. The pupa shares the characteristic of the *poweri* group in having paddle margins with distinct denticles, without a fringe of long hair-like spicules except *amaltheus*, which shares the characteristic of the *africanus* and *scutellaris* groups in having paddle margins with a fringe of long hair-like spicules. The larva resembles the *poweri* and *simpsoni* groups in having comb scales in a single row, marginal spicules of the anal segment very small and inconspicuous, and the ventral brush (4-X) with 4 pairs of setae.

BIONOMICS. The immature stages of the *dendrophilus* group have been found in tree holes, bamboo pots, tree forks, cut bamboos, leaf axils of *Dracaena hookeriana,* banana, pineapple, lily; bored bamboos, rot holes, stump holes, fern tree, bamboo stump, log hole, tree buttress, rock hole and artificial containers (plastic bottles, tin cans). Females of 11 species, *amaltheus*, *bambusae*, *deboeri, demeilloni, dendrophilus*, *hansfordi, keniensis*, *kenyae*, *masseyi*, *mattinglyorum* and *segermanae*, are known to bite man.

MEDICAL IMPORTANCE. Smithburn et al. (1948: 118) reported that in Uganda, Rift Valley fever virus was isolated from a lot of 60 *Stegomyia,* belonging to a species which they refered to as "*A. (S.) deboeri* ssp. *demeilloni* Edw." Based on a detailed morphological study of the specimens from Bwamba, Uganda, it is now apparent that the so-called "*demeilloni*" from

Bwamba, which has the tarsal claws with modified tooth, is conspecific with specimens from Eshowe, South Africa, the new species *hansfordi*.

Garnham (1949: 490) suggested that *Ae. deboeri* may be the jungle vector of the yellow fever virus in Langata, Kenya.

Kemp and Jupp (1991: 580) stated that *Ae. demeilloni* must be considered a potential vector of dengue in South Africa, as its restricted distribution coincides with the densely populated Natal coast.

Although very little has been reported regarding the medical significance of members of this group, the females of several species attack humans readily and can be abundant near villages and plantations. They should be considered of potential public health importance. The confusion and inability to separate the adults of many species may account for the few published accounts of attempts to isolate pathogens from members of this group. It is hoped that this paper will stimulate investigations on that subject.

KEYS TO SPECIES OF THE *DENDROPHILUS* GROUP

Males and Females

(males of *muroafcete* and *njombiensis* unknown)

1. Hindtibia with a white stripe on ventral surface in basal area (Figs. 3A,B,C; 4A,B,C; 5B; 6B,C; 7B,C; 8B,C; 9B,C; 13B,C; 14B,C) 2

   Hindtibia without a white stripe on ventral surface in basal area (Figs. 1B,C; 10B,C; 11B; 12B,C) 11

2(1). White knee-spot absent on hindfemur, or represented by few pale scales (Figs. 3A,B; 5B) 3

   White knee-spot present and well developed on hindfemur (Figs. 3C; 4A,B,C; 6B,C; 7B,C; 8B,C; 9B,C; 13B,C; 14B,C) 4

3(2). Hindtarsomere 5 all dark (Fig. 5B) . . . . . *muroafcete* (p. 54)

   Hindtarsomere 5 with basal 0.50-0.75 white on dorsal surface (Figs. 3A,B) . . . . . *bambusae* (p. 19)

4(2). Hindtarsomere 5 all dark (Figs. 4B,C) . . . . . *deboeri* (p. 22)

   Hindtarsomere 5 with a basal white band or all white (Figs. 3C; 4A; 6B,C; 7B,C; 8B,C; 9B,C; 13B,C; 14B,C) 5

5(4). Scutum with anterior median white spot of broad scales (Fig. 13A) . . . . . *mattinglyorum* (p. 49)

   Scutum with anterior median white spot of narrow scales (Figs. 5C; 7C) 6

6(5). Hindleg with tarsal claws equal and toothed (Figs. 2C,D; 7D,E; 8A,D) 7

   Hindleg with tarsal claws equal and simple (Figs. 14A,D) 9

7(6). Female fore-, mid- and hindlegs with tarsal claws equal and toothed (modified tooth); male hindleg with tarsal claws equal and toothed (modified tooth) (Figs. 8A,D) . . . . . *hansfordi* (p. 33)

Female fore-, mid- and hindlegs with tarsal claws equal and toothed (normal tooth); male hindleg with tarsal claws equal and toothed (normal tooth) (Figs. 7D,E) 8

8(7). Hindtarsomere 3 with basal 0.2 or less white on dorsal surface; hindtarsomere 5 with basal 0.47-0.88 white on dorsal surface (Figs. 3C; 4A) . . . . . *kenyae* (p. 44)

Hindtarsomere 3 with basal 0.32-0.41 white on dorsal surface; Hindtarsomere 5 all white (female), or with basal 0.84-0.89 white to all white on dorsal surface (male) (Figs. 7B,C) . . . . . *dendrophilus* (p. 29)

9(6). Female fore- and midlegs with tarsal claws equal and simple; male fore- and midlegs with tarsal claws unequal, all simple (Figs. 14A,D) . . . . . *segermanae* (p. 57)

Female fore- and midlegs with tarsal claws equal and toothed; male fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple (Figs. 6A,D; 9A,D) 10

10(9). Midtarsomere 1 with a well-marked white stripe on posterior surface; hindtarsomere 5 with basal 0.40-0.67 white on dorsal surface (Figs. 9B,C) . . . . . *heischi* (p. 38)

Midtarsomere 1 without a well-marked white stripe on posterior surface; hindtarsomere 5 all white, or all white except tip (Figs. 6B,C) . . . . . *demeilloni* (p. 25)

11(1). Hindtarsomere 3 with basal 0.11-0.25 white on dorsal surface (Figs. 10B,C; 11B) 12

Hindtarsomere 3 all dark (Figs. 1B,C; 12B,C) 13

12(11). Scutum with anterior median white spot of broad scales (Fig. 11C) . . . . . *keniensis* (p. 42)

Scutum with anterior median white spot of narrow scales (Fig. 11A) . . . . . *njombiensis* (p. 56)

13(11). Scutum with yellow median stripe, the yellow median stripe connects with the anterior median white spot; male fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple (Figs. 12A,E) . . . . . *masseyi* (p. 47)

Scutum with white median stripe, the white median stripe does not connect with the anterior median white spot; male fore- and midlegs with tarsal claws unequal, all toothed (Figs. 1A,D) . . . . . *amaltheus* (p. 17)

Male Genitalia

1. Claspette simple, short, rounded apically, with numerous simple setae on the slightly expanded distal portion and bearing no spine-like seta (Fig. 15A) . . . . . *amaltheus* (p. 17)

Claspette large, lobed, distal expanded portion square, or subtriangular, or oval in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 1-5 strong, basally widened spine-like setae (Figs. 15B; 16A,B; 17A,B; 18A,B; 19A; 20A,B; 21C) 2

2(1). Claspette with distal expanded portion square in dorsal aspect (narrows towards apicolateral angle, with basolateral corner rounded) (Figs. 16B;18A) 3

Claspette with distal expanded portion subtriangular, or oval in dorsal aspect (Figs. 15B; 16A; 17A,B; 18B; 19A; 20A,B; 21C) 4

3(2). Claspette with 2 stronger, basally widened spine-like setae on the apicomesal angle; aedeagus with lateral teeth longer and/or stouter than the others (Fig. 18A) . . . . . *dendrophilus* (p. 29)

Claspette with 3 (2-3) stout, basally widened spine-like setae on the apicomesal angle; aedeagus with all rather short teeth (Fig. 16B) . . . . . *kenyae* (p. 44)

4(2). Claspette with distal expanded portion subtriangular in dorsal aspect (Figs. 15B; 18B) 5

Claspette with distal expanded portion oval in dorsal aspect (Figs. 16A; 17A,B; 19A; 20A,B; 21C) 6

5(4). Claspette narrows towards apical angle, with a 90° basolateral angle, with 2 stout, basally widened spine-like setae on the basomesal angle; aedeagus with lateral teeth longer and stouter than the others (Fig. 18B) ..... *hansfordi* (p. 33)

Claspette narrows towards apical angle, with basolateral corner rounded, with 3 (2-4) stout, basally widened spine-like setae on the basomesal angle; aedeagus with all rather short teeth (Fig. 15B) ..... *bambusae* (p. 19)

6(4). Claspette with lateral and mesal sides more or less parallel (Figs. 16A; 21C) 7

Claspette narrows towards apex, broadened at base (Figs. 17A,B; 19A; 20A,B) 8

7(6). Claspette with 2-3 stout, basally widened spine-like setae on the mesal side (Fig. 16A) ..... *deboeri* (p. 22)

Claspette with 1 strong, basally widened spine-like seta on the basomesal corner (Fig. 21C) ..... *mattinglyorum* (p. 49)

8(6). Aedeagus with 2-3 teeth distinctly longer than the others (Figs. 17A,B; 19A) 9

Aedeagus without 2-3 teeth distinctly longer than the others (Figs. 20A,B) 11

9(8). Claspette with lateral side rather straight, with mesal side rounded, with 2-3 stout, basally widened spine-like setae on the mesal side (Fig. 17B) ..... *segermanae* (p. 57)

Claspette narrows towards apex, broadened at base, with 2-5 stout, basally widened spine-like setae on the mesal side (Figs. 17A; 19A) 10

10(9). Claspette with 2-3 stout, basally widened spine-like setae on mesal side near the middle (Fig. 19A) ..... *heischi* (p. 38)

Claspette with 4 (3-5) stout, basally widened spine-like setae on the mesal side in basal 0.67 (Fig. 17A) ..... *demeilloni* (p. 25)

11(8). Claspette with lateral side rather straight, with mesal side rounded, with 3-4 stout, basally widened spine-like setae on the mesal side (Fig. 20A) . . . . . *keniensis* (p. 42)

Claspette narrows towards apex, broadened at base, with 3-4 stout, basally widened spine-like setae on the mesal side (Fig. 20B) . . . . . *masseyi* (p. 47)

Pupae

(pupae of *keniensis*, *kenyae*, *masseyi*, *muroafcete*, *njombiensis* and *segermanae* unknown)

1. Paddle margins with fringe of long hair-like spicules . . . . . *amaltheus* (p. 17)

Paddle margins with distinct denticles, without fringe of long hair-like spicules (Figs. 21B; 25A; 25B; 25C; 25D; 25E) 2

2(1). Paddle apex with a notch (Fig. 25B) . . . . . *demeilloni* (p. 25)

Paddle apex without a notch (Figs. 21B; 25A; 25C; 25D; 25E) 3

3(2). Seta 5-IV-VI usually single (1-2); paddle apex rounded, or somewhat pointed (Figs. 21B; 25A; 25C; 25D; 25E) 4

Seta 5-IV-VI usually double; paddle apex somewhat pointed . . . . . *bambusae* (p. 19)

4(3). Seta 9-VII usually double (1-3); paddle apex rounded, or somewhat pointed (Fig. 21B; 25A) 5

Seta 9-VII usually single (1-2); paddle apex somewhat pointed (Figs. 25C; 25D; 25E) 6

5(4). Seta 9-VII usually double (1-2); paddle apex rounded (Fig. 21B) . . . . . *mattinglyorum* (p. 49)

Seta 9-VII usually double (2-3), rarely single; paddle apex somewhat pointed (Fig. 25A) . . . . . *deboeri* (p. 22)

6(4). Seta 9-VIII usually with 3-4 branches (2-5) (Figs. 25C; 25D) 7

Seta 9-VIII usually with 2 branches (2-5) (Fig. 25E) . . . . . *heischi* (p. 38)

7(6). Seta 9-VIII usually with 4 branches (3-5); male genital lobe about as long as wide (Fig. 25D) . . . . . *hansfordi* (p. 33)

Seta 9-VIII usually with 3 branches (2-5); male genital lobe much shorter than wide (Fig. 25C) . . . . . *dendrophilus* (p. 29)

Fourth Stage Larvae

(larva of *masseyi** is not known with certainty, and larvae of *muroafcete*, *njombiensis* and *segermanae* unknown)

1. Comb scale with free portion widened at base and sharply pointed at apex, and with fine denticles on basal portion of apical spine (Figs. 22C; 23A; 24A,B) 2

Comb scale with a strong, basal denticle on either side of the apical spine, and with a few finer basal denticles (Figs. 19B; 23B) 7

2(1). Pecten spines arranged in discontinuous groups, with 1-5 spines in each . . . . . *kenyae* (p. 44)

Pecten spines more or less evenly spaced, at most with apical 1-3 spines widely separated from remainder (Figs. 19B; 22C; 23A,B; 24A,B) 3

3(2). Seta 1-S double, rarely single (Figs. 22C; 23A) 4

Seta 1-S single, rarely double (Figs. 24A,B) 6

4(3). Seta 1-S inserted at middle of siphon (Fig. 22C) . . . . . *mattinglyorum* (p. 49)

Seta 1-S inserted beyond the middle of siphon (Fig. 23A) 5

5(4). Seta 1-S simple, and inserted at 0.6 of siphon . . . . . *bambusae* (p. 19)

Seta 1-S barbed, and inserted at 0.67 of siphon (Fig. 23A) . . . . . *deboeri* (p. 22)

6(3). Seta 1-S inserted at middle of siphon (Fig. 24A) . . . . . *dendrophilus* (p. 29)

Seta 1-S inserted slightly beyond the middle of siphon (Fig. 24B) . . . . . *hansfordi* (p. 33)

7(1). Pecten spine with fine denticles on ventral side, or sometimes on both sides (Figs. 19B; 23B) 8

Pecten spine always with 1 large ventral basal denticle and 1 or 2 smaller ones, sometimes with a minute dorsal denticle 10

8(7). Seta 3-X with 2 branches, rarely single (Fig. 23B) . . . . . *demeilloni* (p. 25)

Seta 3-X single (Fig. 19B) 9

9(8). Basal spine of meso- and metapleural setal groups large and curved (Fig. 25F) . . . . . *heischi* (p. 38)

Basal spine of meso- and metapleural setal groups small and straight . . . . . *keniensis* (p. 42)

10(7). Seta 1-X very short and single . . . . . *masseyi** (p. 47)

Seta 1-X long and branched . . . . . *amaltheus* (p. 17)

TAXONOMIC TREATMENT

Aedes (Stegomyia) amaltheus de Meillon and Lavoipierre
(Figs. 1A, B, C, D; 15A)

Aedes (*Stegomyia*) *amaltheus* de Meillon and Lavoipierre 1944: 52 (M*, F, L*); de Meillon et al 1945: 98 (P*); Hopkins 1952: 154 (L*); Mattingly 1952: 246 (key to adults), 247, 248 (key to larvae) and 1953: 6 (taxonomy), 18 (distribution), 35 (zoogeography); Muspratt 1956: 76 (M*, F, L*); Huang 1974: 28 (M*, F*, taxonomy).

FEMALE. *Head.* Proboscis slightly longer than forefemur; maxillary palpus 0.2 length of proboscis; pedicel covered with white scales except on dorsal and ventral surfaces; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 1A). Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow white scales, median white stripe indistinct or incomplete on anterior 0.5 of scutum, reaching to prescutellar area; prescutellar line of narrow white scales present; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral white line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 1.6-2.0 length of vein R_{2+3}. *Halter.* With dark and white scales. *Legs* (Fig. 1B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.32; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.60-0.62 that widens 0.3 from base; mid- and hindtibiae all dark; foretarsomere 1 with basal 0.20-0.23 white on dorsal surface; foretarsomere 2 with basal 0.35-0.55 white on dorsal surface; midtarsomere 1 with basal 0.31-0.48 white on dorsal surface; midtarsomere 2 with basal 0.56-0.68 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1, 2, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.30-0.34 and 0.30-0.43; hindtarsomeres 3, 5 all dark; hindtarsomere 4 all white; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple. *Abdomen.* Tergum I with white scales on laterotergite; tergum I sometimes with a small median white spot; terga II-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sterna III-VII each with a basal white band; segment VIII largely to completely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 6 larger setae on apical 0.4; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 4-6 setae; apical margin of postgenital plate without or with a shallow median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus longer than proboscis (1.11 length of proboscis), predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete; palpomere 5 with basal white band on ventral surface unusually long, occupying about basal 0.66-0.75. *Thorax.* Median longitudinal white stripe sometimes reaching to anterior median white spot.

Wing. Cell R_2 about 1.5 length of vein R_{2+3}. *Legs* (Figs. 1C, D). Fore- and midlegs with tarsal claws unequal, all toothed. *Abdomen.* Tergum I with white scales on laterotergite; tergum II sometimes with basolateral white spots only. *Genitalia* (Fig. 15A). Gonocoxite 3.6-4 times as long as wide; claspette simple, short, reaching to at most 0.5 of gonocoxite, rounded apically, with numerous setae on the slightly expanded distal portion; gonostylus simple, elongate, about 0.8 length of gonocoxite, with a long slender gonostylar claw process near apex and a few setae in apical 0.5; aedeagus strongly toothed; paraproct without the usual sternal arm; apical margin of tergum IX deeply concave medially with 3-5 short setae on lateral lobe.

PUPA and LARVA. Detailed descriptions will be given when adequate specimens are available.

The larva of *Ae. amaltheus* was described by de Meillon and Lavoipierre (1944), Hopkins (1952) and Muspratt (1956). The following diagnostic characters of *amaltheus* are derived from de Meillon and Lavoipierre (1944), Hopkins (1952) and Muspratt (1956).

The larva of *Ae. amaltheus* is very similar to that of *Ae. keniensis* in having the similar shape of the comb scale (with large basal denticles), the seta 3-X single, and the basal spine of meso- and metapleural setal groups small and straight, but can be distinguished easily from that of *keniensis* by the pecten spine always with 1 large ventral basal denticle and 1 or 2 smaller ones, sometimes with a minute dorsal denticle (Hopkins 1952: 154). The larva of *Ae. amaltheus* can be distinguished from those of *Ae. bambusae, deboeri, demeilloni, dendrophilus, hansfordi, heischi, keniensis, kenyae* and *mattinglyorum* by seta 1-A with 2-4 branches (Hopkins 1952: 154). In *bambusae, deboeri, demeilloni, dendrophilus, hansfordi, heischi, keniensis, kenyae* and *mattinglyorum*, seta 1-A is single.

The pupa of *Ae. amaltheus* was described by de Meillon et al (1945). The following diagnostic characters of *amaltheus* are derived from de Meillon et al (1945).

The pupa of *Ae. amaltheus* is very similar to those of *Ae. unilineatus* (Theobald) and *Ae. africanus* (Theobald) in having the paddle margins with a fringe of long hair-like spicules, but can be distinguished from those of *unilineatus* and *africanus* by the seta 9-II-V, stout, single; 9-VI well developed, with 1-2 branches and sometimes forked; seta 1-P single, short (de Meillon et al 1945: 99). The pupa of *Ae. amaltheus* can be distinguished easily from those of *Ae. bambusae, deboeri, demeilloni, dendrophilus, hansfordi, heischi* and *mattinglyorum* by paddle margins with a fringe of long hair-like spicules (de Meillon et al 1945: 99). In *bambusae, deboeri, demeilloni, dendrophilus, hansfordi, heischi* and *mattinglyorum,* the paddle margins have distinct denticles, without a fringe of long hair-like spicules.

TYPE DATA. *Aedes (Stegomyia) amaltheus* de Meillon and Lavoipierre, holotype male (#1556, Livingstone, N. Rhodesia, 9-12-1942, J. Muspratt), with genitalia on a slide, in the South African Institute for Medical Research, Johannesburg, South Africa [SAIM]; type locality: Livingstone (17° 50' S, 25° 49' E), ZAMBIA (N. Rhodesia), 9-XII-1942 (J. Muspratt). Paratypes: 1 male, A58/43(1/5), with genitalia on slide (SEAMP Acc. 314, 72/901) and 1 female, A58/43(1/2), with genitalia on slide (SEAMP Acc. 314, 72/899), same data as holotype, in the SAIM.

OTHER MATERIAL EXAMINED. ZAMBIA. Livingstone (17° 50' S, 25° 49' E), N. Rhodesia, 1942, J. Muspratt, (B.M., 1946-82), 2 F (MEP Acc. 719) [BMNH]; same data, 1 M, 3 F [BMNH]; same data except 1946, G.G. Robinson, 1 M [BMNH]; same data, 1 M, 1 M gen (MEP Acc. 808, 95/193) [DVBD]; Balovale (13° 34' S, 23° 07' E), N. Rhodesia, 1945, G. G. Robinson, (B.M., 1947-135), 1 F, 1 F gen (MEP Acc. 778, 95/192) [BMNH].

ZIMBABWE. Ndanga (20° 11' S, 31° 20' E), S. Rhodesia, XI-1946, E.V. Meeger, 1 F (MEP Acc. 778) [BMNH].

DISTRIBUTION (Map 1). This species is known from Zambia and Zimbabwe. Mattingly (1953: 18) recorded *Ae. amaltheus* from Kasane (17° 49' S, 25° 09' E), Botswana [as Bechuanaland] (de Meillon 1947), but I have not seen these specimens.

Based on the present collection data, *Ae. amaltheus* occurs in the western and southern parts of Zambia, and in the southeastern part of Zimbabwe. It may also be found in the northeast corner of Botswana.

TAXONOMIC DISCUSSION. *Aedes amaltheus* differs from congeners of the *dendrophilus* group by: (1) scutum with anterior median white spot of narrow scales; (2) hindfemur with a distinct white knee-spot; (3) hindtibia without a white longitudinal stripe on ventral surface in basal area; (4) hindtarsomere 4 all white; (5) hindtarsomeres 3 and 5 all dark; (6) female fore- and midlegs with tarsal claws equal and toothed; (7) male fore- and midlegs with tarsal claws unequal, all toothed; and (8) hindleg with tarsal claws equal and simple.

The adult male and female of *Ae. amaltheus* are extremely similar to those of *Ae. masseyi.* However, *Ae. amaltheus* differs from *masseyi* by: (1) scutum with white median stripe, the white median stripe does not connect with the anterior median white spot; and (2) male fore- and midlegs with tarsal claws unequal, all toothed. In *masseyi*, the scutum has a yellow median stripe, the yellow median stripe connect with the anterior median white spot; and the male fore- and midtarsal claws, which are unequal, the smaller one toothed, the larger one simple.

The male genitalia of *Ae. amaltheus* are easily differentiated from all other species in the *dendrophilus* group by the claspette, which is simple, short, reaching to at most 0.50 of gonocoxite, rounded apically, with numerous setae on the slightly expanded distal portion and bearing no spine-like seta; and by the paraproct, which has an unusal sternal arm (very short and closer to apex of paraproct).

Aedes amaltheus occurs in habitats between 1,066 and 1,333 m in areas of yearly rainfall of 63.5-101.6 cm.

BIONOMICS. Larvae of type specimens were collected from tree hole in Livingstone, Zambia [as N. Rhodesia].

Mattingly (1953: 28) reported that "*Aedes amaltheus.* Known only from tree-holes (de Meillon & Lavoipierre, 1944)." A few specimens were taken biting on the forest floor at Kasane (Mattingly 1953).

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) bambusae Edwards
(Figs. 2A; 3A, B; 15B)

Aedes (Stegomyia) bambusae Edwards 1935: 134 (M, F); Edwards 1941: 148 (M, F*), 390 (P); Hopkins 1952: 155 (L); Mattingly 1952: 246 (key to adults), 249 (key to larvae) and 1953: 14 (taxonomy), 21 (distribution), 43 (zoogeography).

FEMALE. *Head.* Proboscis slightly longer than forefemur; maxillary palpus 0.2 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad pale yellow scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 2A). Scutum with narrow dark scales, and a distinct median pale yellow spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow yellow scales, median yellow stripe connected with anterior median spot, reaching to prescutellar area; prescutellar line well developed, with narrow yellow scales, connecting with median longitudinal

stripe at anterior margin of prescutellar area; fossal area with a large patch of broader crescent-shaped yellow scales, fossal yellow patch with anterior end extending along scutal margin towards the anterior median pale yellow spot; posterior dorsocentral yellow line of narrow scales present, reaching forward to the posterior end of fossal yellow patch; a patch of narrow pale yellow scales on lateral margin just in front of wing root; scutellum with broad pale yellow scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a patch of broad white scales and some dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of pale yellow scales on costa; cell R_2 3.2-4.3 length of vein R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 3A). White knee-spot absent on fore- and hindfemora (sometimes represented by few pale scales on hindfemur), present on midfemur; white knee-spot on midfemur usually much reduced; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.25-0.40; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.56-0.69 that widens 0.30-0.39 from base; midtibia anteriorly dark, with a basal white spot on posterior surface; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.22-0.31; foretarsomere 1 with basal 0.10-0.19 white on dorsal surface; foretarsomere 2 with basal 0.46-0.47 white on dorsal surface; midtarsomere 1 with basal 0.14-0.19 white on dorsal surface; midtarsomere 2 with basal 0.88 to all white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.20-0.22, 0.20-0.27 and 0.17-0.22; hindtarsomere 4 all white; hindtarsomere 5 with basal 0.50-0.75 white on dorsal surface; fore-, mid- and hindlegs with tarsal claws equal, all toothed. *Abdomen.* Tergum I with white scales on laterotergite; tergum II with basolateral white spots; terga III-VII each with a basal pale yellow band and basolateral white spots which do not connect with the basal pale yellow band; sterna II-IV largely with pale scales; sterna V-VII each with a basal pale band; segment VIII largely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 3 larger setae on apical 0.4; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 2-7 setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus slightly shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, white band on palpomere 2 sometimes much reduced or absent, those on palpomeres 4,5 dorsally incomplete. *Wing.* Cell R_2 2.7-2.9 length of vein R_{2+3}. *Legs* (Fig. 3B). Foretarsomere 2 with basal 0.19-0.30 white on dorsal surface; midtarsomere 2 with basal 0.9-0.93 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.11-0.20, 0.17-0.20 and 0.17-0.19; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Abdomen.* Sterna III-VII each with a basal pale band. *Genitalia* (Fig. 15B). Gonocoxite 2 times as long as wide; claspette large, lobed, distal expanded portion subtriangular in dorsal aspect (narrows towards apical angle, with basolateral corner rounded), with numerous simple setae on the expanded distal portion and with 3 (2-4) strong, basally widened spine-like setae on basomesal angle; gonostylus simple, elongate, about 0.6 length of gonocoxite, with a long slender gonostylar claw at apex and with a few setae in apical 0.5; aedeagus with all rather short teeth; paraproct with a sternal arm; apical margin of tergum IX concave medially with 10-12 setae on lateral lobe.

PUPA and LARVA. Detailed descriptions will be given when adequate specimens are available.

The following diagnostic characters of the larva *bambusae* are derived from Hopkins (1952).

The larva of *Ae. bambusae* is extremely similar to that of *Ae. deboeri* in having both comb scales and pecten spines appearing simple or almost simple and in having seta 1-S double, rarely single. However, *Ae. bambusae* can be distinguished from *deboeri* by seta 1-S double, rarely single, simple, and inserted at 0.6 of the siphon (Hopkins 1952: 155). In *deboeri,* seta 1-S is double, rarely single, barbed, and inserted at 0.67 of the siphon.

The following diagnostic characters of the pupa *bambusae* are derived from Edwards (1941).

The pupa of *Ae. bambusae* is extremely similar to that of *Ae. deboeri* in having the paddle margins with distinct denticles, without a fringe of long hair-like spicules and the paddle apex somewhat pointed, but can be distinguished from *deboeri* by seta 5-IV-VI usually double. In *deboeri*, seta 5-IV-VI is single.

TYPE DATA. *Aedes* (*Stegomyia*) *bambusae* Edwards, holotype male (Mt. Mgahinga, 8,000 ft., F.W. Edwards, S. W. Uganda, Kigezi Province, XI. 1934, B.M. E. Afr. Exp. B.M., 1935-203), with genitalia on slide (SAMP Acc. 1587, 93/104), in BMNH; type locality: Mt. Mgahinga (1° 23' S, 29° 39' E), *Kigezi District*, UGANDA, XI-1934 (F.W. Edwards). Type female, same data as holotype male, in the BMNH.

OTHER MATERIAL EXAMINED. UGANDA. *Kigezi District*: Mt. Mgahinga (1° 23' S, 29° 39' E), 8,000 ft, (S. W. Uganda), XI-1934, F.W. Edwards, (B.M. E. Afr. Exp. B.M., 1935-203), 1 F [BMNH]; same data, 2 M, 1 F, 2 M gen, 1 F gen (MEP Acc. 719, 92/547, 93/103, 92/548) [BMNH]; Mt. Sabinio (1° 25' S, 29° 34' E), 8,000 ft, (S. W. Uganda), XI-1934, F.W. Edwards, (B.M. E. Afr. Exp. B.M., 1935-203), 2 M, 2 M gen (MEP Acc. 719, 92/549, 92/550) [BMNH]; Muko (1° 13' S, 29° 50' E), 7,500 ft., (S. W. Uganda), XI-1934, E.G. Gibbins, (B.M. E. Afr. Exp. B.M., 1935-203), 1 M, 1 M gen (MEP Acc. 719, 92/551) [BMNH]; same data, 1 M, 1 M gen (MEP Acc. 725, 92/552) [CMT]; Chuya Forest (1° 15' S, 29° 45' E), V-1949, A.J. Haddow, bred bored bamboo II, 1 M, 1 M gen (MEP Acc. 808, 92/553) [DVBD]; same data except bred bored bamboos IV, VI, 2 M, 2 M gen (MEP Acc. 808, 92/554, 95/202) [DVBD]; same data except bred bored bamboos III, V, 2 F, 1 F gen (MEP Acc. 808, 92/555) [DVBD].

ZAIRE. *Kivu-Central*: Kivu (3° 00' S, 28° 30' E), 3,000 m, bamboo Forest, 1951, R. Faiu, 1 M, 1 M gen (MEP Acc. 719, 92/556) [BMNH]; Kivu, Mt. Kasirusiru = Mt. Kausi (2° 20' S, 28° 40' E), 15-XI-1951, J. Wolfs, 1 M, 1 M gen (MEP Acc. 725, 92/557) [CMT].

DISTRIBUTION (Map 2). This species is known from Uganda and Zaire. In Uganda, *Ae. bambusae* is found between Mts. Mgahinga and Sabinio, along Zaire-Uganda border, to the northeast such as Muko and Chuya Forest, in the southwestern part of Uganda. It is also found in Kivu and Mt. Kasirusiru, Zaire.

TAXONOMIC DISCUSSION. *Aedes bambusae* differs from congeners of the *dendrophilus* group by: (1) white knee-spot absent on hindfemur, sometimes represented by few pale scales; (2) hindtibia with a white longitudinal stripe on ventral surface in basal 0.22-0.31; (3) hindtarsomere 3 with basal 0.17-0.22 white on dorsal surface; (4) hindtarsomere 4 all white; (5) hindtarsomere 5 with basal 0.5-0.75 white on dorsal surface; (6) female fore- and midlegs with tarsal claws equal and toothed; (7) male fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple; and (8) hindleg with tarsal claws equal and toothed.

The adult male and female of *Ae. bambusae* are extremely similar to those of *Ae. kenyae,* but can be distinguished from *kenyae* by the hindfemur without a distinct white knee-spot. This same character state of *Ae. bambusae* is extremely similar to that of *Ae. muroafcete.* However, *Ae. bambusae* can be distinguished easily from *muroafcete* by the

hindtarsomere 5 with basal 0.5-0.75 white on dorsal surface. In *muroafcete*, the hindtarsomere 5 is all dark.

The male genitalia of *Ae. bambusae* are differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion subtriangular in dorsal aspect (narrows towards apical angle, with basolateral corner rounded), with numerous simple setae on the expanded distal portion and with 3 (2-4) strong, basally widened spine-like setae on the basomesal angle.

Aedes bambusae is apparently an East African Montane bamboo-forest species that occurs in habitats between 1,666 and 3,000 m in areas of yearly rainfall of 127-152.4 cm.

BIONOMICS. The immature stages of *Ae. bambusae* have been collected from bored bamboos that were placed in Chuya Forest, Uganda.

Edwards (1935: 134) reported that between Mts. Mgahinga and Sabinio, Congo-Uganda border, and at Muko, S.W. of Kabale, both localities in bamboo-forest at about 2, 666 m, some adults were captured and others were reared from larvae found in bamboo stems.

Mattingly (1953: 29) reported that "*Aedes bambusae.* Known only from bored bamboos (Hopkins, 1936)."

Aedes bambusae has been collected in association with *Ae. angustus* Edwards from both localities mentioned above (Edwards 1935).

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) deboeri Edwards
(Figs. 2B, C, D; 4B, C; 16A; 23A; 25A)

Aedes (Stegomyia) deboeri Edwards 1926: 128 (M, F); Edwards 1941: 147 (M*, F); van Someren 1946a: 112 (P, L); Garnham 1949: 489, 490 (bionomics); Hopkins 1952: 150 (L); Mattingly 1952: 247 (key to adults), 249 (key to larvae) and 1953: 14 (taxonomy), 21 (distribution), 43 (zoogeography).

FEMALE. *Head.* Proboscis slightly longer than forefemur; maxillary palpus 0.24 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 2B). Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow pale yellow scales, median yellow stripe connected with anterior median white spot, reaching to prescutellar area and forks at beginning of prescutellar area; prescutellar line of narrow pale yellow scales present; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral pale yellow line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a small patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.8-2.9 length of vein R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 4B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.34-0.38; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.51-0.62 that widens 0.40-0.48 from

base; midtibia anteriorly dark, with a basal white spot on posterior surface; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.35-0.37; foretarsomere 1 with basal 0.10-0.14 white on dorsal surface; foretarsomere 2 with basal 0.35 white on dorsal surface; midtarsomere 1 with basal 0.16-0.23 white on dorsal surface; midtarsomere 2 with basal 0.38 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.2-0.3, 0.25-0.31, and 0.20-0.22; hindtarsomere 4 all white, with a few dark scales at apex on ventral surface; hindtarsomere 5 all dark, sometimes with a few pale scales at base; fore-, mid- and hindlegs with tarsal claws equal, all toothed (Fig. 2C). *Abdomen.* Tergum I with white scales on laterotergite; tergum II with basolateral white spots, or sometimes tergum II with basolateral white spots and a basal median white spot; terga III-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sterna III-VII each with a basal white band; segment VIII largely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 4 larger setae on apical 0.3; tergum IX as long as broad, apical margin of tergum IX with well developed lateral lobes, each with 5 setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing.* Cell R_2 2.2-2.8 length of vein R_{2+3}. *Legs* (Fig. 4C). Foretarsomere 2 with basal 0.17-0.24 white on dorsal surface; midtarsomere 2 with basal 0.27-0.33 white on dorsal surface; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple (Fig. 2D). *Abdomen.* Tergum II with basolateral white spots only; tergum III sometimes with basolateral white spots only. *Genitalia* (Fig. 16A). Gonocoxite 2.3 times as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (lateral and mesal sides more or less parallel), with numerous simple setae on the expanded distal portion and with 2-3 stout, basally widened spine-like setae on mesal side; gonostylus simple, elongate, about 0.5 length of gonocoxite, with a long slender gonostylar claw at apex and with a few setae in apical 0.25; aedeagus with all rather short teeth; paraproct with a sternal arm; apical margin of tergum IX concave medially with 10-14 setae on lateral lobe.

PUPA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Abdomen.* Seta 5-IV-VI single, short, not extended beyond posterior margin of following segment; 9-I-IV small, single, simple; 9-V-VI, or 9-VI single, simple, slightly stouter than 9-I-IV; 9-VII usually with 2 branches (2-3), rarely single, barbed; 9-VIII usually with 4 branches (3-7) and barbed. *Paddle* (Fig. 25A). Oval, about 1.4 times as long as wide; margins with distinct denticles, without fringe of long hair-like spicules; apex somewhate pointed. Male genital lobe about as long as wide.

LARVA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Head.* Seta 1-A single, simple. *Thorax.* Basal spine of meso- and metapleural setal groups rather short, straight, pointed at tip. *Abdomen.* Seta 1-VIII usually with 3 branches (2-3), barbed; 3-VIII usually with 4 branches (3-5), barbed; 5-VIII usually double (2-3), barbed; comb usually with 10(8-12) scales in a row, each scale with free portion widened at base and sharply pointed at apex, and with fine denticles on basal portion of apical spine; saddle incomplete, marginal spicules very small and inconspicuous; seta 1-X double, barbed; 2-X usually double (2-3); 3-X single; 4-X with 4 pairs of setae on grid, 4a,b,c-X double, 4d-X usually double (1-2). *Siphon.* 2.7 times as long as wide 0.5 from base; usually with 10(8-15) pecten spines, evenly spaced, usually with apical 1 (1-3) spine widely separated from remainder, each spine usually with fine denticles on ventral side, or sometimes on both sides; seta 1-S usually double, rarely single, barbed, inserted beyond middle of siphon and before apical pecten spine.

TYPE DATA. *Aedes* (*Stegomyia*) *deboeri* Edwards, Cotype female (MEP Acc. 719/ Nairobi, Brit. E. Africa, 12. VIII. 1912, T.J. Anderson/ Pres. by Ent. Res. Committee, 1912-475), in BMNH; type locality: Nairobi, *Nairobi Area,* KENYA, 12-VIII-1912 (T.J. Anderson). I hereby designate this female as the lectotype. Cotype male (Nairobi, Kenya, IX-1924, Dr. van Someren, B.M., 1925-33) (in poor condition, abdomen and hindtarsomeres 2-5 missing), with genitalia on a plastic plate, in the BMNH. Cotype female (Nairobi, Brit. E. Africa, 22-IV-1912, T.J. Anderson, B.M., 1912-301) (midleg with tarsomeres 2-5 missing), in the BMNH.

Edwards (1926: 129) stated that "Cotypes, 1 M, IX. 1921 (Dr. van Someren); 2 F, 22. IV. and 12. VIII. 1912 (T.J. Anderson)." Consequently, the statement of Townsend (1990: 66) that *Ae. deboeri* Edwards is represented by two syntypes (1 male, 1 female) is erroneous as three cotypes (1 male, 2 females) were mentioned earlier by Edwards in his original description of *Aedes* (*Stegomyia*) *deboeri* (1926: 128-129).

OTHER MATERIAL EXAMINED. KENYA. *Nairobi Area*: Nairobi (1° 17' S, 36° 50' E), II-1947, 3 M, 2 M gen (MEP Acc. 719, 92/534, 92/535) [BMNH]; same data, 6 M, 2 F [BMNH]; same data, 2 M, 1 M gen (92/536) [USNM]; same data except V-1959, 3 M, 2 F, 2 M gen, 1 F gen (MEP Acc. 724, 95/199, 95/200, 95/203) [ORSTOM]; Karen (1° 20' S, 36° 42' E), VI-1967, E.C.C. van Someren, tree hole, 2 M, 2 M gen (MEP Acc. 808, 92/558, 95/198) [DVBD]; same data, 1 M, 1 M gen (MEP Acc. 1036, 92/537) [DVBD]; Langata (1° 20' S, 36° 45' E), 1944, van Someren, 1 F, 1 F gen (MEP Acc. 808, 92/559) [DVBD]. Kenya, date unspecified, 2 M, 1 F, 2 M gen (MEP Acc. 726, 92/560, 94/382) [LSHTM]; Ngong Forest (1° 18' S, 36° 44' E), 4-V-1983, Y.M. Huang, biting on man, 1 F (MEP Acc. 1035, #54) [USNM]; same data except 6-V-1983, Y.M. Huang, tree holes, about 0.33-1.5 m above ground, partially shaded, 13 M, 9 F, 22 individual rearings (17 l, 22 p) (MEP Acc. 1035, #65, #67, #68), 1 M gen (MEP Acc. 1035, #67, 95/301) [USNM]; same data except 6-V-1983, Y.M. Huang, resting on vegetation in forest, deeply shaded, 1 M (MEP Acc. #73) [USNM]; Karura Forest (1° 14' S, 36° 50' E), 9-V-1983, Y.M. Huang, bamboo pot placed on tree, 2 m above the ground, in the forest, 28 M, 6 F, 34 individual rearings (7 l, 34 p) (MEP Acc. 1035, #78) [USNM]; same data except 9-V-1983, Y.M. Huang, tin cans placed on trees, 1 m above the ground, in the forest, 22 M, 18 F, 40 individual rearings (11 l, 40 p) (MEP Acc. 1035, #83, #85), 3 M gen (MEP Acc. 1035, #83, 95/302, 95/303, 95/304) [USNM]; same data except 9-V-1983, Y.M. Huang, tin cans placed on ground, in the forest, 2 M, 20 F, 22 individual rearing (22 l, 22 p) (MEP Acc. 1035, #82, #166, #169) [USNM]; same data except 9-V-1983, Y.M. Huang, tree buttress, 1 F, 1 individual rearing (1p) (MEP Acc. 1035, #94-102) [USNM]. *Central Region*: Arboretum Forest Reserve (1° 16' S, 36° 48' E), 14-VI-1983, Y.M. Huang, tree fork, about 0.33 m above the ground, partially shaded, in the forest, 1 M, 1 individual rearing (1 p) (MEP Acc. 1035, #214-127) [USNM].

DISTRIBUTION (Map 2). This species is known only from Kenya. *Aedes deboeri* occurs mainly in the inland Nairobi area such as Langata Forest. It is found from Langata in the south, to Karen in the west, to Ngong Forest in the north, through Nairobi, Arboretum Forest Reserve to Karura Forest in the northeast.

TAXONOMIC DISCUSSION. *Aedes deboeri* has the scutum with an anterior median white spot of narrow scales, hindfemur with a distinct white knee-spot, hindtibia with a white longitudinal stripe on ventral surface in basal 0.35-0.37, hindtarsomere 3 with basal 0.2-0.22 white on dorsal surface, hindtarsomere 4 all white, and hindtarsal claws equal and toothed. It can be distinguished easily from all other species of the *dendrophilus* group except *Ae. kenyae*. *Aedes deboeri* can be distinguished from *kenyae*, however, by the hindtarsomere 5 all dark. In *kenyae*, the hindtarsomere 5 has basal 0.47-0.88 white on dorsal surface.

The male genitalia of *Ae. deboeri* are easily differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion oval in dorsal aspect (lateral and mesal sides more or less parallel), with numerous simple setae on the expanded distal portion and with 2-3 stout, basally widened spine-like setae on the mesal side.

The larva of *Ae. deboeri* (Fig. 23A) is extremely similar to that of *Ae. mattinglyorum* in having the comb scale with the free portion widened at base and sharply pointed at apex, and with fine denticles on basal portion of apical spine, the pecten spine with fine denticles on ventral side, or sometimes on both sides, and in having the seta 1-S double, rarely single, barbed. However, *Ae. deboeri* can be distinguished from *mattinglyorum* by seta 1-S inserted beyond the middle of siphon. The larva of *Ae. deboeri* is also extremely similar to that of *Ae. bambusae* with similar comb scales and pecten spines, but can be distinguished from *bambusae* by the diagnostic characters mentioned under the discussion of *bambusae.*

The pupa of *Ae. deboeri* is extremely similar to that of *Ae. bambusae*, but can be distinguished from *bambusae* by the diagnostic character mentioned under the discussion of *bambusae.*

Aedes deboeri is apparently an East African Highland species that occurs in habitats between 1,833 and 2,133 m in areas of yearly rainfall of 88.9 cm.

BIONOMICS. Larvae of *Ae. deboeri* were collected from tree holes in Nairobi and in Karen. The immature stages of this species have been collected from tree holes, 0.33-1.5 m above ground, partially shaded, in Ngong Forest, Nairobi Area; from tree fork, about 0.33 m above ground, partially shaded, in Arboretum Forest Reserve and from tree buttress, in Karura Forest; and from bamboo pot placed on tree, 2 m above ground and from tin cans that were placed on trees, 1 m above ground and on ground (oviposition trap), in Karura Forest, Kenya.

Mattingly (1953: 29) reported that "*Aedes deboeri.* Known only from tree-holes (E.C.C. van Someren, 1946a)."

Preferred ovipositional sites for *Ae. deboeri* based on the present study were tree holes and tin cans that were placed on trees, 1 m above ground and on ground in the forest, while tree fork, tree buttress and bamboo pot placed on tree, 2 m above ground in the forest were less commonly used.

One female was taken biting man and 1 male was taken resting on vegetation, in deep shade, in Ngong Forest.

Garnham (1949) reported that *Ae. deboeri* is the principal man-biting *Aedes* in the Langata Forest.

MEDICAL IMPORTANCE. Unknown. Garnham (1949: 490) suggested that *Ae. deboeri* may be the jungle vector of the yellow fever virus in Langata.

Aedes (Stegomyia) demeilloni Edwards
(Figs. 6A, B, C, D; 17A; 23B; 25B)

Aedes (Stegomyia) deboeri var. *demeilloni* Edwards 1936: 55 (A).
Aedes (Stegomyia) deboeri ssp. *demeilloni* Edwards 1941: 147 (M, F) (in part).
Aedes (Stegomyia) demeilloni Edwards, Mattingly 1952: 247 (key to adults) and 1953: 8 (taxonomy; to sp. status), 19 (distribution) (in part); Hopkins 1952: 148 (bionomics); Muspratt 1956: 56 (M*, F*, L*) (in part); Kemp and Jupp 1991: 578, 589 (bionomics).

FEMALE. *Head.* Proboscis longer than forefemur; maxillary palpus 0.21-0.23 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax.* Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow pale yellow scales, median yellow stripe usually indistinct or incomplete in anterior 0.33-0.50 of scutum, reaching to prescutellar area; prescutellar line of narrow white scales usually not present, with only a few narrow white scales; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral pale yellow line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a small patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.6-3.6 length of vein R_{2+3}. *Halter.* With dark and white scales. *Legs* (Fig. 6B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow white longitudinal stripe on ventral surface in basal 0.37-0.49; midfemur anteriorly without a large, median white spot, sometimes with some pale scales scattered in basal 0.6; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.57-0.63 that widens 0.2-0.28 from base; midtibia anteriorly dark; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.14-0.24; foretarsomere 1 with basal 0.15-0.22 white on dorsal surface; foretarsomere 2 with basal 0.2-0.48 white on dorsal surface; midtarsomere 1 with basal 0.26-0.32 white on dorsal surface; midtarsomere 2 with basal 0.41-0.65 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.28-0.32, 0.26-0.38, and 0.25-0.36; hindtarsomere 4 all white, sometimes with a few dark scales at apex on ventral surface; hindtarsomere 5 all white except tip to all white on dorsal surface; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple (Fig. 6A). *Abdomen.* Tergum I with white scales on laterotergite; terga II-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; tergum II sometimes with basolateral white spots only; sterna III-VII each with a basal white band; segment VIII completely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 2 larger setae on apical 0.33; tergum IX as long as broad, apical margin of tergum IX with well developed lateral lobes, each with 3-4 setae; apical margin of postgenital plate without, or with a shallow median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus as long as to slightly shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Thorax.* Holotype male with median yellow stripe reaching forward to the anterior median white spot; prescutellar line of narrow white scales usually present. *Wing.* Cell R_2 1.9-2.3 length of vein R_{2+3}. *Legs* (Fig. 6C). Midtarsomere 2 with basal 0.35-0.4 white on dorsal surface; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple (Fig. 6D). *Abdomen.* Tergum II with basolateral white spots only. *Genitalia* (Fig. 17A). Gonocoxite 1.9 times as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (narrows towards apex, broadened at base), with numerous simple setae on the expanded distal portion and bearing 4 (3-5) stout, basally widened spine-like setae on mesal side in basal 0.67; gonostylus simple, elongate, about 0.6 length of gonocoxite, with a short and blunt gonostylar claw at apex and with a few setae in apical 0.25; aedeagus strongly toothed, with 2-3 lateral teeth longer than the others;

paraproct with a short sternal arm; apical margin of tergum IX deeply concave medially with 7-9 setae on lateral lobe.

PUPA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Abdomen.* Seta 5-IV-VI usually single (1-2), short, not extended beyond posterior margin of following segment; 9-I-II small, single, simple; 9-III-VI single, simple, longer and stouter than 9-I-II; 9-VII single or double, barbed; 9-VIII usually with 4 branches (2-5) and barbed. *Paddle* (Fig. 25B). Oval, about 1.1 times as long wide; margins with distinct denticles, without fringe of long hair-like spicules; apex notched. Male genital lobe short and broad, shorter than wide.

LARVA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Head.* Seta 1-A single, simple. *Thorax.* Basal spine of meso- and metapleural setal groups large and curved. *Abdomen.* Seta 1-VIII usually with 4 branches (3-5), barbed; 3-VIII usually with 5 branches (4-8), barbed; 5-VIII usually with 4 branches (4-6), barbed; comb usually with 10(6-12) scales in a row, each scales with a strong, basal denticle on either side of the apical spine, and with a few finer basal denticles; saddle incomplete, marginal spicules very small and inconspicuous; seta 1-X usually double (2-4), barbed; 2-X usually with 3 branches (3-5); 3-X with 2 branches, rarely single; 4-X with 4 pairs of setae on grid, 4a,c-X usually double (2-3), 4b-X usually with 3 branches (2-3), 4d-X double. *Siphon.* 2.2 times as long as wide 0.5 from base; usually with 13(8-13) pecten spines, evenly spaced, usually with apical 1-2 spines widely separated from remainder, each spine usually with fine denticles on ventral side, or sometimes on both sides; seta 1-S usually with 3 branches (2-3), barbed, inserted at middle of siphon and before apical pecten spine.

TYPE DATA. *Aedes (Stegomyia) deboeri* var. *demeilloni* Edwards, holotype male (S. Africa, Dr. A. Ingram, B.M., 1928-412. Cocked Hat Palm), with genitalia on a plastic plate, in BMNH; type locality: Eshowe, Zululand, *Natal,* SOUTH AFRICA.

OTHER MATERIAL EXAMINED. SOUTH AFRICA. *Natal*: Eshowe (28° 53' S, 31° 28' E), V-1975, J. Muspratt, 518 m above sea level, from axils of *Dracaena hookeriana* Koch, (Topotypic, ESH/75, Ct6/-), 3 M (ESH/75, Ct6/V1, Ct6/V5, Ct6/-), 6 F (ESH/75, Ct6/V2, Ct6/V3, Ct6/V4, Ct6/V6, Ct6/-, Ct6/-), 9 individual rearings (6 l, 6 p), 3 M gen, 2 F gen (MEP Acc. 506, 79/204, 78/223, 78/224, 95/206, 95/207) [USNM]. S. Africa, Dr. A. Ingram, (B.M., 1928-412. Cocked Hat Palm), 1 M, 1 M gen (MEP Acc. 719, 79/203) [BMNH]; Eshowe, Zululand, Fern tree in Forest near Lab., 6-XI-1935, 1 M (#739), 1 M gen (MEP Acc. 802, 90/66) [SAIM]; Impetyeni Forest = Impetyne Forest (30° 40' S, 29° 35' E), 1951, J. Muspratt, 1 M [BMNH]; Stanger Beach (29° 20' S, 31° 20' E), 1952, J. Muspratt, 1 F (MEP Acc. 802/ SAIMR, CSIR-52, Coll. No. N.C.427) [SAIM]; Melville (30° 39' S, 30° 31' E), I-1968, B.M. McIntosh, No. 6862, leave axils of *Dracaena hookeriana,* 1 F (MEP Acc. 801, M563/K) [NIV]; same data, 2 M (M1349-8), 2 F (M1349-8), 2 M gen (MEP Acc. 801, 92/631, 92/632) [NIV]; Hlinza Forest, Eshowe district (28° 55' S, 31° 20' E), 31-I-1980, Y.M. Huang, bamboo pot placed on tree, 34 M, 48 F, 4 M gen (MEP Acc. 806, #105, 92/561, 95/248, 95/249, 95/332) [USNM]; same data except 18-II-1980, Y.M. Huang, 10 M, 15 F, 5 M gen, 2 F gen (MEP Acc. 806, #110, 90/90, 95/237, 95/238, 95/239, 95/240, 95/245, 95/246) [USNM]; Bishop's Seat (in Hlinza Forest), 8-II-1980, Y.M. Huang, bamboo pot placed on tree, in the forest, 7 M, 14 F, 4 M gen (MEP Acc. 806, #114, 95/241, 95/242, 95/243, 95/244) [USNM]; Jozini, Makanes Drift (27° 01' S, 32° 16' E), II-1980, Y.M. Huang, bamboo pot placed on a fig tree along Pongola River, 1 M, 1 M gen (MEP Acc. 806, #109, 95/247) [USNM]; same data except 12-II-1980, 1 F (MEP Acc. 806, #111-92) [USNM]; Amanzimtoti (30° 03' S, 30° 53' E), 13-III-1980, J. Muspratt, 1 M, 1 F, 1 M gen (MEP Acc. 810, #120-11, -12, 92/562) [USNM].

DISTRIBUTION (Map 2). This species is known only from South Africa. Based on the present collection data, *Ae. demeilloni* occurs mainly along the coast of South Africa. It is

found from Eshowe to Makanes Drift in the northeast, to Hlinza Forest in the southwest, through stanger Beach, Amanzimtoti, to Melville in the south and to Impetyeni Forest in the southwest.

TAXONOMIC DISCUSSION. *Aedes demeilloni* differs from congeners of the *dendrophilus* group by: (1) scutum with anterior median white spot of narrow scales; (2) hindfemur with a distinct white knee-spot; (3) hindtibia with a white longitudinal stripe on ventral surface in basal 0.14-0.24; (4) hindtarsomere 3 with basal 0.25-0.36 white on dorsal surface; (5) hindtarsomere 4 all white on dorsal surface; (6) hindtarsomere 5 all white except tip to all white on dorsal surface; (7) female fore- and midlegs with tarsal claws equal and toothed; (8) male fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple; and (9) female and male hindleg with tarsal claws equal and simple.

The adult male and female of *Ae. demeilloni* are extremely similar to those of *Ae. heischi*, but can be distinguished from *heischi* by the diagnostic characters mentioned under the discussion of *heischi.*

The adult male and female of *Ae. demeilloni* are easily confused with those of *Ae. segermanae.* However, *Ae. demeilloni* can be distinguished easily from *segermanae* by the diagnostic characters mentioned under the discussion of *segermanae.*

The male genitalia of *Ae. demeilloni* are differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion oval in dorsal aspect (narrows towards apex, broadened at base), with numerous simple setae on the expanded distal portion and bearing 4 (3-5) stout, basally widened spine-like setae on mesal side in basal 0.67, and by the gonostylar claw, which is short and blunt.

The larva of *Ae. demeilloni* (Fig. 23B) is very similar to that of *heischi* in having the comb scale with a strong, basal denticle on either side of the apical spine, and with a few finer basal denticles, and in having the pecten spine with fine denticles on ventral side, or sometimes on both sides. However, *Ae. demeilloni* can be distinguished from *heischi* by seta 3-X usually with 2 branches, rarely single. In *heischi*, seta 3-X is single.

The pupa of *Ae. demeilloni* is very similar to those of *Ae. bambusae, deboeri, dendrophilus, hansfordi, heischi* and *mattinglyorum* in having the paddle margins with distinct denticles, without fringe of long hair-like spicules, but can be distinguished from *bambusae, deboeri, dendrophilus, hansfordi, heischi* and *mattinglyorum* by the paddle apex with a notch.

Aedes demeilloni occurs in habitats between <166 and 566 m in areas of yearly rainfall of 101.6-152.4 cm.

BIONOMICS. The immature stages of *Ae. demeilloni* have been collected from leaf axils of *Dracaena hookeriana*, 518 m above sea level in Eshowe (Topotypic specimens); from bamboo pots that were placed on trees, about 1-1.5 m above ground, partially shaded, in forests, in Hlinza Forest, Eshowe district, Makanes Drift and in Amanzimtoti, Natal; from Fern tree in forest near Lab. and from Cocked Hat Palm (type specimen), in Eshowe, Zululand, Natal.

Hopkins (1952: 148) reported that "Breeding-places. Known only from the axils of "Fern Trees" - P.F.M." (Mattingly, noted in Hopkins 1952: 148).

Muspratt (1956: 58) reported that *Ae. demeilloni* preferred *Dracaena hookeriana* axils, and occasionally tree holes and bananas.

Preferred ovipositional sites for *Ae. demeilloni* based on the present study were axils of *Dracaena hookeriana* and bamboo pots that were placed on trees in forests, while Cocked Hat Palm and Fern tree in forest were less commonly used.

Aedes demeilloni has been collected with *Ae. hansfordi* from bamboo pots (MEP Acc. 806, #105, #110, #114) that were placed on trees in Hlinza Forest, in Eshowe. It has also been found in association with *Ae. segermanae* from leaf axils of *Dracaena hookeriana* (MEP Acc.

801, No. 6862) in Melville, Natal and with *Ae. heischi* from a bamboo pot (MEP Acc. 806, #109) that was placed on a fig tree along Pongola River in Makanes Drift, Natal.

Muspratt (1956: 58) stated that the females of *demeilloni* attack man during the daytime.

Kemp and Jupp (1991: 578) reported that "*Aedes demeilloni* was found to bite readily during the midday period. The biting rates measured in 1991 were 13 per man-hour at Armadale (collection effort = 4.2 man-hours between 1000and 1215 h) and 38.8 per man-hour at Palm Beach (collection effort = 1.7 man-hours between 1155 and 1250 h)."

Kemp and Jupp (1991: 580) stated that *Ae. demeilloni* is a highly anthropophilic species, as the 1991 collection at Palm Beach shows. However, it is not know whether the specimens from Palm Beach that Kemp and Jupp (1991) regarded as *demeilloni* are really *demeilloni*, or are the new species *segermanae*, or included both species.

MEDICAL IMPORTANCE. Unknown. Kemp and Jupp (1991: 580) stated that *Ae. demeilloni* must be considered a potential vector of dengue as its restricted distribution coincides with the densely populated Natal coast.

Aedes (Stegomyia) dendrophilus Edwards
(Figs. 5C; 7A, B, C, D, E; 18A; 24A; 25C)

Aedes (Stegomyia) dendrophila Edwards 1921: 74 (M, F).

Aedes (Stegomyia) dendrophilus Edwards 1941: 140 (M*, F) (in part); Mattingly 1952: 240 (taxonomy; synonymized *trinidad*), 250 (distribution) (in part); Mattingly and Lips 1953: 322 (distribution); Ribeiro and Ramos 1973: 121 (distribution).

Aedes (Stegomyia) trinidad Gil Collado 1936: 326 (M*, P*).

FEMALE. *Head.* Proboscis as long as forefemur; maxillary palpus 0.27-0.29 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 7A). Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow white scales, median white stripe usually indistinct or incomplete on anterior 0.33-0.50 of scutum, reaching to prescutellar area; prescutellar line of narrow white scales present; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral white line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a small patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.6-3.1 length of vein R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 7B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.27-0.33; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.58-0.62 that widens 0.38-0.42 from base; midtibia anteriorly dark, with a basal white spot on posterior surface; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.27-0.36; foretarsomere 1 with basal 0.14-0.17 white on dorsal surface; foretarsomere 2 with basal 0.35-0.40 white on dorsal surface; midtarsomere 1 with basal 0.26-0.31 white on dorsal surface; midtarsomere 2 all white; midtarsomere 3 with or without white scales on dorsal

surface (topotypic female has midtarsomere 3 all white on dorsal surface); hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.28-0.34, 0.32-0.38 and 0.32-0.41; hindtarsomeres 4, 5 all white on dorsal surfaces; fore- mid- and hindlegs with tarsal claws equal, all toothed (Fig. 7D). *Abdomen.* Tergum I with white scales on laterotergite; terga II-III with basolateral white spots; terga IV-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sometimes tergum III with a basal white band and basolateral white spots which do not connect with the basal white band; sterna III-VII each with a basal white band; segment VIII largely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 2-4 larger setae on apical 0.5; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 1-3 setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus slightly shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, white band on palpomere 2 usually much reduced or absent, those on palpomeres 4, 5 dorsally incomplete; vertex with all broad pale or white scales. *Thorax* (Fig. 5C). Median white stripe usually broader posteriorly and reaching to prescutellar area; prescutellar line well developed, with narrow white scales connected with median longitudinal stripe at anterior margin of prescutellar area; supraalar area with a large patch of narrow white scales and reaching to posterior dorsocentral white line; scutellum with broad white scales on all lobes and without a few broad dark scales at apex of midlobe. *Wing.* Cell R_2 2.1-2.5 length of vein R_{2+3}. *Legs* (Fig. 7C). Foretarsomere 2 with basal 0.21-0.23 white on dorsal surface; (holotype male has midtarsomere 3 all white on dorsal surface); hindtarsomere 4 with basal 0.81-0.93 white on dorsal surface; hindtarsomere 5 with basal 0.84-0.89 white, to all white on dorsal surface (holotype male has hindtarsomeres 4, 5 with a basal white band); fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple (Fig. 7E). *Genitalia* (Fig. 18A). Gonocoxite 2.2 times as long as wide; claspette large, lobed, distal expanded portion square in dorsal aspect (narrows towards apicolateral angle, with basolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 2 stronger, basally widened spine-like setae on apicomesal angle; gonostylus simple, elongate, about 0.4 length of gonocoxite, with a long slender gonostylar claw at apex and with a few setae in apical 0.50; aedeagus strongly toothed, with lateral teeth longer and/or stouter than the others; paraproct with a sternal arm; apical margin of tergum IX concave medially with 5-8 setae on lateral lobe.

PUPA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Abdomen.* Seta 5-IV-VI single, short, not extended beyond posterior margin of following segment; 9-I-III small, single, simple; 9-IV-VI single, simple, stouter than 9-I-III; 9-VII usually single (1-2), barbed, or forked at tip; 9-VIII usually with 3 branches (2-5) and barbed. *Paddle* (Fig. 25C). Oval, about 1.5 times as long as wide; margins with distinct denticles, without fringe of long hair-like spicules; apex somewhate pointed. Male genital lobe short and broad, much shorter than wide.

LARVA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Head.* Seta 1-A single, simple. *Thorax.* Basal spine of meso- and metapleural setal groups long, straight, pointed at tip. *Abdomen.* Seta 1-VIII usually with 3 branches (1-4), barbed; 3-VIII usually with 4 branches (2-6), barbed; 5-VIII usually with 4 branches (2-4), barbed; comb usually with 10 (8-12) scales in a row, each scale with free portion widened at base and sharply pointed at apex, and with fine denticles on basal portion of apical spine; saddle incomplete, marginal spicules very small and inconspicuous; seta 1-X usually double (2-3), barbed; 2-X usually double (1-3); 3-X single; 4-X with 4 pairs of setae on grid, 4a-X single, 4b,c-X usually single (1-2), 4d-X usually double (1-2). *Siphon.* 2.4 times as long as wide 0.5 from base;

usually with 9(8-14) pecten spines, evenly spaced, usually with apical 1-2 spines widely separated from remainder, each spine usually with fine denticles on ventral side, or sometimes on both sides; seta 1-S single, rarely double, barbed, inserted at middle of siphon and before apical pecten spine.

TYPE DATA. *Aedes (Stegomyia) dendrophila* Edwards, holotype male (Gold Coast: Oblogo, Tree hole 1, 17-IV-1920, Dr. A. Ingram, B.M., 1921-45), with genitalia on a plastic plate, in BMNH; type locality: Oblogo (5° 36' N, 0° 17' W), *Eastern Region*, GHANA (Gold Coast), 17-IV-1920 (Dr. A. Ingram).

OTHER MATERIAL EXAMINED. GHANA. *Eastern Region*: Oblogo (5° 36' N, 0° 17' W), Gold Coast, tree hole 1, 17-IV-1920, Dr. A. Ingram, (B. M., 1921-45), 1 F [BMNH]; same data, 2 F, 1 F gen (MEP Acc. 719, 92/202) [BMNH]; same data except date unspecified, Dr. A. Ingram, (B.M., 1921-45), 4 M, 1 F, 4 M gen (MEP Acc. 719, 92/181, 92/200, 92/417, 92/418) [BMNH]; Nsawam (5° 48' N, 0° 20' W), Gold Coast, 14-IV-1920, Dr. A. Ingram, (B.M., 1920-227), from larvae in rot hole in Cotton tree, 2 F, 2 F gen (MEP Acc. 719, 92/182, 92/183) [BMNH]; same data except 16-III-1920, Dr. A. Ingram, (B.M., 1921-45), Cotton tree, 1 M, 1 M gen (MEP Acc. 719, 92/180) [BMNH]; Aburi (5° 51' N, 0° 10' W), Gold Coast, 6-VI-1920, Dr. A. Ingram, (B.M., 1921-45), Bamboo, 1 M, 1 M gen (MEP Acc. 719, 92/201) [BMNH].

IVORY COAST. *Centre, Departement du*: M'Bahiakro, Dezidougou (7° 44' N, 4° 16' W), 22-V-1985, B. Bouchite, sweeping, 1 M, 1 M gen (SAMP Acc. 1138, IV 167, 92/400) [USNM]; same data except 24-V-1985, Huang & Pecor, plastic bottle placed on ORSTOM study tower, 12 m above ground (IV 142), 6 M, 6 F, 12 individual rearings (11 l, 12 p), 6 M gen (SAMP Acc. 1138, 85/299, 85/300, 85/301, 85/302, 92/396, 92/406), 2 F gen (SAMP Acc. 1138, 92/402, 92/403) [USNM]; same data except 4 m above ground (IV 149), 8 M, 3 F, 11 individual rearings (4 l, 11 p), 5 M gen (SAMP Acc. 1138, 92/397, 92/407, 92/408, 92/446, 92/447), 2 F gen (SAMP Acc. 1138, 92/404, 92/405) [USNM]; same data except 20 m above ground (IV 133), 4 M, 2 F, 6 individual rearings (6 p), 4 M gen (SAMP Acc. 1138, 92/388, 92/389, 92/450, 92/451) [USNM]; same data except 16 m above ground (IV 138, IV 139), 6 M, 7 F, 13 individual rearings (8 l, 12 p), 3 L, 4 M gen (SAMP Acc. 1138, IV 138, 93/50, 93/51; IV 139, 92/452, 92/453) [USNM]; same data except 9-VI-1985, 20 m above ground (IV 339), 9 M, 5 F, 14 individual rearings (5 l, 14 p), 6 L, 6 M gen (SAMP Acc. 1138, 85/226, 85/227, 85/228, 85/229, 93/52, 93/53) [USNM]; same data except 26-30-V-1985, Huang & Pecor, small tree holes (coffee tree), 1-2 m above ground (IV 248, IV 249), partially shaded, in coffee plantation, 4 M, 6 F, 10 individual rearings (10 l, 10 p), 3 M gen (SAMP Acc. 1138, IV 248, 92/394, 92/395; IV 249, 93/48) [USNM]; same data, small tree holes, 1-2 m above ground, in coffee plantation, 3 M, 5 F, 8 individual rearings (7 l, 8 p) (IV 191, IV 259, IV 277, IV 278), 1 M gen (SAMP Acc. 1138, IV 259, 92/448) [USNM]; same data except 30-V-1985, Huang & Pecor, large pot on ground, 1 M, 1 individual rearing (1 p), 1 M gen (SAMP Acc. 1138, IV 282, 92/449) [USNM]; same data except 2-VI-1985, Huang & Pecor, tree fork, 1 m above ground, partially shaded, 1 F, 1 individual rearing (1 l, 1 p) (SAMP Acc. 1138, IV 292) [USNM]; same data except 4-VI-1985, Huang & Pecor, small tree holes, 1-2 m above ground, partially shaded, in coffee plantation, 2 M, 5 F, 7 individual rearings (6 l, 7 p) (SAMP Acc. 1138, IV 321, IV 322, IV 324, IV 326) [USNM]; Kofidougou (7° 45' N, 4° 19' W), 26-V-1985, Huang & Pecor, plastic bottle placed on ORSTOM study tower, 12 m above ground (IV 158), 4 M, 6 F, 10 individual rearings (6 l, 10 p), 1 L, 4 M gen (SAMP Acc. 1138, 85/213, 85/214, 92/390, 92/391) [USNM]; same data, 12 m above ground (IV 159, IV 160, IV 161), 4 M, 3 F, 7 individual rearings (3 l, 4 p), 2 M gen (SAMP Acc. 1138, IV 159, 85/215; IV 161, 85/218) [USNM]; same data except 9 m above ground (IV 162, IV 163, IV 164, IV 165), 7 M, 5 F, 12 individual rearings (7 l, 12 p), 5 M gen (SAMP Acc. 1138, IV 163, 85/224, 85/225, 93/49; IV 165, 92/392, 92/393) [USNM];

KM 2, 24-V-1985, Huang & Pecor, plastic bottle placed on ORSTOM study tower, 12 m above ground, 1 M, 1 individual rearing (1 l, 1 p), 1 M gen (SAMP Acc. 1138, IV 150-10, 93/47) [USNM].

DISTRIBUTION (Map 3). This species is presently known from Ghana and the Ivory Coast. Mattingly (1952: 250) recorded *Ae. dendrophilus* from Santa Isabel (3° 46' N, 8° 46' E), Equatorial Guinea (as Fernando Po); Mattingly and Lips (1953: 322) recorded it from Elisabethville (11° 40' S, 27° 34' E) and Kimilolo River (11° 43' S, 27° 31' E), Zaire, and Ribeiro and Ramos (1973: 121) recorded it from Salazar (9° 19' S, 14° 57' E), Angola, but I have not seen these specimens. Records of this species from Zaire and Angola by Mattingly and Lips (1953) and by Ribeiro and Ramos (1973) may refer to *hansfordi.*

Based on the present collection data, *Ae. dendrophilus* occurs in the southeastern part of Ghana (Oblogo, Nsawam and Aburi), and in the eastern part of the Ivory Coast (Dezidougou and Kofidougou).

TAXONOMIC DISCUSSION. *Aedes dendrophilus* has the scutum with an anterior median white spot of narrow scales, hindfemur with a distinct white knee-spot, hindtibia with a white longitudinal stripe on ventral surface in basal 0.27-0.36, hindtarsomere 3 with basal 0.32-0.41 white on dorsal surface, and hindtarsal claws equal and toothed. It can be distinguished easily from all other species of the *dendrophilus* group except *Ae. hansfordi.* However, *Ae. dendrophilus* differs from *Ae. hansfordi* by : (1) female fore-, mid- and hindlegs with tarsal claws equal and toothed (normal tooth); and (2) male hindtarsomere 4 with basal 0.81-0.93 white on dorsal surface, hindtarsomere 5 with basal 0.84-0.89 white or all white on dorsal surface, and hindleg with tarsal claws equal and toothed (normal tooth).

The adult male and female of *Ae. dendrophilus* are easily confused with those of *Ae. hansfordi.* However, *Ae. dendrophilus* can be distinguished from *hansfordi* by the diagnostic characters mentioned under the discussion of *hansfordi.*

The adult male and female of *Ae. dendrophilus* are also extremely similar to those of *Ae. mattinglyorum*, but can be distinguished easily from *mattinglyorum* by the scutum with anterior median white spot of narrow scales, and by the hindleg with tarsal claws equal and toothed. In *mattinglyorum*, the scutum has anterior median white spot of broad scales, and the hindtarsal claws which are equal and simple.

The male genitalia of *Ae. dendrophilus* are easily differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion square in dorsal aspect (narrows towards apicolateral angle, with basolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 2 stronger, basally widened, spine-like setae on the apicomesal angle; and by the aedeagus, which has lateral teeth longer and/or stouter than the others.

The larva of *Ae. dendrophilus* (Fig. 24A) is extremely similar to that of *Ae. mattinglyorum* with similar comb scales and pecten spines, but can be distinguished from *mattinglyorum* by seta 1-S single, rarely double. In *mattinglyorum*, seta 1-S is double, rarely single.

The pupa of *Ae. dendrophilus* is extremely similar to that of *Ae. hansfordi,* but can be distinguished from *hansfordi* by the diagnostic characters mentioned under the discussion of *hansfordi.*

Aedes dendrophilus is apparently a forest species that occurs in habitats between <166 and 466 m in areas of yearly rainfall of 101.6-114.3 cm.

BIONOMICS. Larvae of *Ae. dendrophilus* were collected from tree holes, rot holes in Oblogo and Nsawam, and from bamboo, in Aburi, Ghana. In the Ivory Coast, the immature stages of *Ae. dendrophilus* have been collected from small tree holes (coffee tree), 1-2 m above

ground, partially shaded, in coffee plantation; from tree fork, 1 m above ground, partially shaded and from a large pot on ground in plantation, in Dezidougou; and from plastic bottles that were placed on ORSTOM study towers, from 4-20 m above ground, partially shaded in forests, in Dezidougou and Kofidougou, Ivory Coast.

Preferred ovipositional sites for *Ae. dendrophilus* based on the present study were tree holes, rot holes and plastic bottles that were placed on ORSTOM study towers in forests, while tree fork, bamboo and large pot on ground in forest were less commonly used.

Aedes dendrophilus has been collected in association with *Ae. mattinglyorum* from Nsawam, Ghana, and from Dezidougou and Kofidougou, Ivory Coast.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) hansfordi New Species
(Figs. 8A, B, C, D; 18B; 24B; 25D)

Aedes (Stegomyia) deboeri subsp. *demeilloni* of van Someren 1946a: 113 (M*, F*, P*, L*, E*) (in part).

Aedes (Stegomyia) dendrophilus of Muspratt 1956: 62 (M*, F*, L*) (in part).

FEMALE. *Head.* Proboscis shorter than forefemur; maxillary palpus 0.22-0.26 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax.* Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow yellow scales, median yellow stripe usually broader posteriorly and reaching to prescutellar area; prescutellar line of narrow pale yellow scales present; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral yellow line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with or without a few broad dark scales at apex of midlobe; postpronotum with a small patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 3.1-3.8 length of vein R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 8B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.23-0.30; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.57-0.63 that widens 0.40-0.50 from base; midtibia anteriorly dark, with a basal white spot on posterior surface; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.30-0.36; foretarsomere 1 with basal 0.11-0.17 white on dorsal surface; foretarsomere 2 with basal 0.38-0.40 white on dorsal surface; midtarsomere 1 with basal 0.20-0.25 white on dorsal surface; midtarsomere 2 with basal 0.88-0.94 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.24-0.30, 0.30-0.36, and 0.27-0.33; hindtarsomeres 4, 5 all white on dorsal surfaces; fore- mid- and hindlegs with tarsal claws equal, all toothed (modified tooth) (Fig. 8A). *Abdomen.* Tergum I with white scales on laterotergite; tergum I sometimes with a median white spot; terga II-III with basolateral white spots; sometimes tergum III with a basal median white spot and basolateral white spots; terga IV-VII each with a basal white band (or patch) and

basolateral white spots which do not connect with the basal white band (or patch); sterna III-VII each with a basal white band; segment VIII largely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 4-6 larger setae on apical 0.4; tergum IX slightly broader than long, apical margin of tergum IX with well developed lateral lobes, each with 4-8 setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus slightly shorter to slightly longer than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, white band on palpomere 2 usually much reduced or absent, those on palpomeres 4, 5 dorsally incomplete. *Thorax.* Median longitudinal stripe usually connected with anterior median white spot; prescutellar line usually well developed, with narrow pale yellow scales connected with median longitudinal stripe at anterior margin of prescutellar area; sometimes supraalar area with a patch of narrow white scales and reaching to posterior dorsocentral white line; scutellum with broad white scales on all lobes and usually without a few broad dark scales at apex of midlobe. *Wing.* Cell R_2 2.5-2.7 length of vein R_{2+3}. *Legs* (Fig. 8C). Foretarsomere 2 with basal 0.14-0.27 white on dorsal surface; midtarsomere 2 with basal 0.69-0.97 white on dorsal surface; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple (Fig. 8D). *Genitalia* (Fig. 18B). Gonocoxite 2 times as long as wide; claspette large, lobed, distal expanded portion subtriangular in dorsal aspect (narrows towards apical angle, with a 90° basolateral angle), with numerous simple setae on the expanded distal portion and with 2 stout, basally widened spine-like setae on basomesal angle; gonostylus simple, elongate, about 0.6 length of gonocoxite, with a long slender gonostylar claw at apex and with a few setae in apical 0.25; aedeagus strongly toothed, with lateral teeth longer and stouter than the others; paraproct with a sternal arm; apical margin of tergum IX concave medially with 12-17 setae on lateral lobe.

PUPA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Abdomen.* Seta 5-IV-VI usually single (1-2), short, not extended beyond posterior margin of following segment; 9-I-III small, single, simple; 9-IV-VI, or 9-V-VI single, simple, stouter than 9-I-III; 9-VII usually single (1-2), barbed; 9-VIII usually with 4 branches (3-5) and barbed. *Paddle* (Fig. 25D). Oval, about 1.4 times as long as wide; margins with distinct denticles, without fringe of long hair-like spicules; apex somewhate pointed. Male genital lobe about as long as wide.

LARVA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Head.* Seta 1-A single, simple. *Thorax.* Basal spine of meso- and metapleural setal groups long, straight, pointed at tip. *Abdomen.* Seta 1-VIII usually double (2-3), barbed; 3-VIII usually with 5 branches (3-5), barbed; 5-VIII usually with 3 branches (2-3), barbed; comb usually with 8 (7-12) scales in a row, each scale with free portion widened at base and sharply pointed at apex, and with fine denticles on basal portion of apical spine; saddle incomplete, marginal spicules very small and inconspicuous; seta 1-X usually double (2-3), barbed; 2-X double; 3-X single; 4-X with 4 pairs of setae on grid, 4a,b,c,d-X all double. *Siphon.* 1.7 times as long as wide 0.5 from base; usually with 11(8-15) pecten spines, evenly spaced, usually with apical 1 spine widely separated from remainder, each spine usually with fine denticles on ventral side, or sometimes on both sides; seta 1-S single, rarely double, barbed, inserted beyond middle of siphon and before apical pecten spine.

TYPE DATA. Holotype male (MEP Acc. 806/South Africa 1980, #114-11, Y. M. Huang), with associated larval and pupal skins on slide, with genitalia on slide (92/459), Bishop's Seat (in Hlinza Forest), Eshowe district (28° 55' S, 31° 20' E), *Natal*, SOUTH AFRICA, collected as larva from a bamboo pot, placed on a tree, partially shaded, in the forest, 8-II-1980 (Y.M. Huang). Deposited in the Smithsonian Institution, Washington, D.C. [USNM]. Allotype

female (MEP Acc. 806, #114-17), with associated larval and pupal skins on slide, same data as holotype [USNM]. Paratypes: 6 males and 1 female as follows, (MEP Acc. 806): 6 males (#114-10,-12,-13,-14,-15,-16), with associated larval and pupal skins on slides, with genitalia on slides (92/460, 92/461, 92/470, 92/471, 92/596, 92/597) and 1 female (#114-18), with associated larval and pupal skins on slide, with genitalia on slide (92/599), same data as holotype [USNM].

OTHER MATERIAL EXAMINED. SOUTH AFRICA. *Natal*: Eshowe (28° 53' S, 31° 28' E), Zululand, pow-pow tree, 30-IX-1935, (MEP Acc. 802), 1 F (#723/ *Aedes (Steg.) demeilloni* Edw., Det. J.M. 1950) [SAIM]; Eshowe, Zululand, Tree hole, near Lab., Coll. 1226, 18-IX-1936, (MEP Acc. 719), 1 M (#875/ *A. deboeri* var. *demeilloni*), 1 M (#880/ *A. deboeri* var. *demeilloni*), 2 M gen (MEP Acc. 719, 92/263, 92/264) [BMNH]; same data, (MEP Acc. 802), 1 M (#894/ *Aedes (Steg.) dendrophilus* Edw., Det. J.M. 1950), 1 F (#901/ *Aedes (Steg.) dendrophilus* Edw., Det. J.M. 1950), 1 M gen (MEP Acc. 802, 92/262) [SAIM]; Amanzimtoti (30° 03' S, 30° 53' E), S. coast Natal, 1950, J. Muspratt, 1 M (SAIMR, CSIR/YF/50, Coll. No. S.C. 70), 1 M gen (MEP Acc. 719, 92/251) [BMNH]; nr. Scottburgh (30° 17' S, 30° 44' E), S. coast Natal, 1950, J. Muspratt, 1 M (SAIMR, CSIR/YF/50, Coll. No. S.C. 48/1), 1 M gen (MEP Acc. 719, 92/252) [BMNH]; Renishaw (29° S, 29° E), 1950, J. Muspratt, 2 M (SAIMR, CSIR-50, Coll. No. S.C. 48/ 2, 3), 1 F (SAIMR, CSIR-50, Coll. No. S.C. 48), 2 M gen (MEP Acc. 802, 92/253, 92/254) [SAIM]; Gwalaweui Jebombo M., near Ingwavuma (27° 10' S, 32° 20' E), B.M. McIntosh, No. 66304, bamboo pot, 1 M (MF222), 1 F (MF222), 1 M gen (MEP Acc. 801, 92/256) [NIV]; Ngome Forest (27° 52' S, 31° 24' E), Zululand, V-1967, B.M. McIntosh, No. 6868, bamboo pot, 2 M (M543), 1 F (M543), 2 M gen (MEP Acc. 801, 90/85, 92/257) [NIV]; Dlinza, Eshowe, B.M. McIntosh, No. 6869, bamboo pot, 1 M (M468/A), 1 M gen (MEP Acc. 801, 90/86) [NIV]; Amanzimtoti near Durban (29° 52' S, 31° 03' E), 18-IV-1977, J. Muspratt, 0-166 m above sea level, from bamboo pot placed in coastal scrub forest, (#SI0020/77), 2 M (MEP Acc. 673, 0020/77, 0020/77/-), 2 M gen (MEP Acc. 673, 92/258, 92/259) [USNM]; same data except 15-II-1978, J. Muspratt, from tree hole in coastal scrub forest, (#SI0003/78), 2 M (MEP Acc. 699, 0003/78/1, 0003/78/-), 2 F (MEP Acc. 699, 0003/78/2, 0003/78/-), 2 M gen (MEP Acc. 699, 92/260, 92/261) [USNM]; Eshowe Office Garden (28° 52' S, 31° 28' E), 21-II-1980, Y.M. Huang, 520 m above sea level, bamboo pot placed on a tree about 1.5 m above ground, 5 M, 8 F, 5 M gen, 1 F gen (MEP Acc. 806, #57, 92/454, 92/455, 92/456, 92/462, 95/266, 95/267) [USNM]; Hlinza Forest, Eshowe district (28° 55' S, 31° 20' E), 31-I-1980, Y.M. Huang, 13 M, 13 F, 7 M gen (MEP Acc. 806, #105, 92/472, 92/618, 92/619, 92/622, 92/623, 92/626, 92/627), 2 F gen (MEP Acc. 806, 92/620, 92/621) [USNM]; same data except 18-II-1980, Y.M. Huang, 18 M, 13 F, 8 M gen (MEP Acc. 806, #110, 92/458, 92/463, 92/464, 92/465, 92/468, 92/469, 92/624, 92/625), 3 F gen (MEP Acc. 806, #110, 92/466, 92/467, 92/598) [USNM]; Ndumu Game Reserve (26° 55' S, 32° 15' E), II-1980, Y.M. Huang, 1 F (MEP Acc. 806, #106) [USNM]; Amanzimtoti (30° 03' S, 30° 53' E), 13-III-1980, J. Muspratt, 1 M (MEP Acc. 810, #120) [USNM]. *Transvaal*: White River district (25° S, 31° E), 1954, J. Muspratt, (SAIMR, CSIR-54, Coll. No. ET613E), 1 M, 1 F, 1 M gen (MEP Acc. 802, 92/255) [SAIM].

BURKINA FASO. *Volta-Noire, Departement de la:* Nasso (11° 13' N, 4° 26' W), Cercle Bobo-Dioulasso, Haute-Volta, 11-VII-1960, J. Hamon, 1 M, 1 M gen (MEP Acc. 724, 92/175) [ORSTOM]; Foret de Nasso, C. Bobo-Dioulasso (11° 12' N, 4° 18' W), Haute-Volta, 15-20-XII-1967, G. Pichon, 5 M (#03, #11, #31, #62, #86), 2 F (#68, #70), 5 M gen (MEP Acc. 724, #03, 92/176; #11, 92/177; #62, 92/178; #86, 92/179; #31, 92/222), 2 F gen (MEP Acc. 724, #68, 92/220; #70, 92/221) [ORSTOM]; Cercle de Bobo-Dioulasso, Foret de Dinderesso (11° 14' N, 4° 22' W), HV659, 1967, F. Rodhain, 1 M, 1 M gen (MEP Acc. 723, 92/223) [PIP]; same data except HV1208, 1967, F. Rodhain, 1 M, 1 M gen (MEP Acc. 723, 92/174) [PIP].

CAMEROON. *Nyong et Sanaga*: N'Kolbisson (3° 53' N, 11° 27' E), Cameroun, 1-IV-1964, A. Rickenbach, 1 F (MEP Acc. 724) [ORSTOM]; Ototomo (3° 39' N, 11° 19' E), Cameroun, 17-VIII-1966, A. Rickenbach, 1 M, 1 M gen (MEP Acc. 724, 92/248) [ORSTOM].

CENTRAL AFRICAN REPUBLIC. *Ombella-Mpoko*: Bozo (5° 10' N, 18° 30' E), 16-IV-1975, J.P. Herve, 1 M (124K), 1 M gen (MEP Acc. 736, 92/249) [ORSTOM]; same data, 1 M (124E), 1 M gen (MEP Acc. 736, 92/250) [ORSTOM]; same data except 9-VII-16-VIII-1979, B. Geoffroy, 1 M (P877), 3 F (P831, P897, P898), 1 M gen (SAMP Acc. 1330, 92/594) [ORSTOM]; same data except 26-IX-1980, B. Geoffroy, 1 F (SAMP Acc. 1330) [ORSTOM]; same data except date unspecified, B. Geoffroy, 1 M (#99), 1 F (#100), 1 M gen (SAMP Acc. 1330, 92/595) [ORSTOM].

IVORY COAST. *Est, Departement de l'*: Farako (8° 36' N, 3° 09' W), Bouna, Cote d'Ivoire, 13-VI-1967, G. Pichon & Rodhain, 1 M, 1 M gen (MEP Acc. 724, 92/172) [ORSTOM]; Goli (8° 04' N, 2° 51' W), Bondoukou, Cote d'Ivoire, 14-VI-1967, J. Hamon & G. Pichon, 1 M, 1 M gen (MEP Acc. 724, 92/173) [ORSTOM].

SENEGAL. *Senegal Oriental*: Kedougou (12° 33' N, 12° 11' W), X-1982, J.P. Hervy, 4 M, 4 M gen (SAMP Acc. 1083, 85/240-85/243) [ORSTOM].

TANZANIA. *Tanga Region*: Amani (5° 05' S, 38° 40' E), Tanganyika, 11-V-1953, M. Christie, 3 M (#500, #501, #502), 1 F (#505), 3 M gen (MEP Acc. 719, 92/225, 92/226, 92/415) [BMNH]; same data except date unspecified, 2 M (06C, 08L), 2 M gen (MEP Acc. 724, 90/80, 92/227) [ORSTOM]; same data except Amani T.T., V-1956, E.C. Hancock, cut bamboo, 1 M (#4), 1 F, 1 M gen, 1 F gen (MEP Acc. 808, 92/228, 92/229) [DVBD]; same data except VI-1956, E.C. Hancock, tree hole, 1 F, 1 F gen (MEP Acc. 808, 92/230) [DVBD]; Sigi T.T. (5° 01' S, 38° 48' E), IX-1956, E.C. Hancock, cut bamboo, 1 F (MEP Acc. 808) [DVBD]. *Morogoro Region*: Kisawasawa (7° 53' S, 36° 52' E), Tanzania, 20-IX-1969, A. McClelland, 1 F (MEP Acc. 808, #3381-1) [DVBD].

UGANDA. *Kingdom of Toro*: Mongiro (0° 49' N, 30° 10' E), Bwamba County, Reared 1943, 1 M, 1 F, 1 M gen (MEP Acc. 726, 90/81) [LSHTM]; same data except (No. 52, No. 15, No. 30, A.J. Haddow), 1 M, 2 F, 1 M gen (MEP Acc. 808, No. 52, 92/231) [DVBD]; same data except Bwamba Prov., IV-1944, van Someren, 1 F, 1 F gen (MEP Acc. 808, 92/232) [DVBD]; same data except (No. 18, No. 43/ A.J. Haddow/ Reared 1943, Bwamba, Uganda/ E.C.C. van Someren, B.M. 1947-195), 1 M, 1 F, 1 M gen (MEP Acc. 719, 92/416) [BMNH]; same data except (No. 27/ E.C.C. van Someren, B.M. 1947-195/ genitalia on slide/ liason pelts in slide collection), 1 M (MEP Acc. 719) [BMNH]; same data except (No. 44, A.J. Haddow), 1 M, 1 M gen (MEP Acc. 724, No. 44, 92/243) [ORSTOM]; same data except Bwamba Prov., IV-1948, van Someren, 1 F (MEP Acc. 724) [ORSTOM]; same data except (Nos. 12, 19, 20, 23, 31, 32, 37, 39, 41, 50, 22, 35, 49, 51, A.J. Haddow), 10 M, 4 F, 10 M gen (MEP Acc. 726, No. 12, 92/411; No. 19, 92/246; No. 20, 92/244; No. 23, 92/247; No. 31, 92/413; No. 32, 92/409; No. 37, 92/414; No. 39, 92/245; No. 41, 92/412; No. 50, 92/410) [LSHTM].

DISTRIBUTION (Map 3). This species is known from Burkina Faso, Cameroon, Central African Republic, Ivory Coast, Senegal, South Africa, Tanzania and Uganda.

Aedes hansfordi is apparently a common species in South Africa. It occurs from Ndumu Game Reserve, Natal in the northeast, to Gwalaweui Jebombo M., near Ingwavuma in the east, through Ngome Forest, Eshowe Office Garden, Eshowe, Hlinza Forest, Amanzimtoti near Durban, to Amanzimtoti and Scottburgh in the south, to Renishaw in the southwest, and to White River district, Transvaal in the northwest.

Aedes hansfordi has also been collected in the eastern part of Tanzania (Amani, Sigi T.T., Kisawasawa) and in the western part of Uganda (Mongiro, Bwamba County). It is also found in the western part of Burkina Faso (Nasso, C. Bobo-Dioulasso, Foret de Dinderesso), in

the southwestern part of Cameroon (N'kolbisson, Ototomo), in the southern part of Central African Republic (Bozo), in the northeastern part of the Ivory Coast (Farako, Goli), and in the southeast corner of Senegal (Kedougou).

ETYMOLOGY. This species is named to honor Dr. Clifford F. Hansford, formerly Director, National Institute for Tropical Diseases, Tzaneen, South Africa, in recognition and appreciation of his contributions to our knowledge of the mosquito fauna of South Africa.

TAXONOMIC DISCUSSION. *Aedes hansfordi* differs from congeners of the *dendrophilus* group by the following combination of characters: (1) scutum with anterior median white spot of narrow scales; (2) hindfemur with a distinct white knee-spot; (3) hindtibia with a white longitudinal stripe on ventral surface in basal 0.30-0.36; (4) hindtarsomere 3 with basal 0.27-0.33 white on dorsal surface; (5) hindtarsomeres 4 and 5 all white on dorsal surface; (6) female fore-, mid- and hindlegs with tarsal claws equal and toothed (modified tooth); and (7) male hindleg with tarsal claws equal and toothed (modified tooth).

Adults of *Ae. hansfordi* are extremely similar to those of *Ae. dendrophilus* with which it has been confused and misidentified. *Aedes hansfordi* can be distinguished easily from *dendrophilus,* however, by: (1) female fore-, mid- and hindlegs with tarsal claws equal and toothed (modified tooth); (2) male hindtarsomeres 4 and 5 all white on dorsal surface; and (3) male hindleg with tarsal claws equal and toothed (modified tooth). In *dendrophilus*, the female fore-, mid- and hindtarsal claws which are equal and toothed (normal tooth); on the male, the hindtarsomere 4 is 0.81-0.93 basally white; the hindtarsomere 5 is 0.84-0.89 basally white, or all white on dorsal surface; and the hindtarsal claws which are equal and toothed (normal tooth).

The adult male and female of *Ae. hansfordi* are very similar to those of *Ae. demeilloni* in having the scutum with anterior median white spot of narrow scales, the hindfemur with a distinct white knee-spot, the hindtibia with a white longitudinal stripe on the ventral surface in basal area, the hindtarsomere 3 with a basal white band, and the hindtarsomeres 4 and 5 all white on dorsal surface. However, *Ae. hansfordi* can easily be distinguished from *demeilloni* by the hindleg, which has tarsal claws equal and toothed (modified tooth). In *demeilloni*, the hindtarsal claws are equal and simple.

The male genitalia of *Ae. hansfordi* are easily differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion subtriangular in dorsal aspect (narrows towards apical angle, with a 90° basolateral angle), with numerous simple setae on the expanded distal portion and with 2 stout, basally widened, spine-like setae on the basomesal angle; and by the aedeagus, which has lateral teeth longer and stouter than the others.

The larva of *Ae. hansfordi* (Fig. 24B) is extremely similar to that of *Ae. mattinglyorum* in having the comb scale with free portion widened at base and sharply pointed at apex, and with fine denticles basal of apical spine, and in having the pecten spine with fine denticles on ventral side, or sometimes on both sides. However, *Ae. hansfordi* can be distinguished from *mattinglyorum* by the seta 1-S single, rarely double. In *mattinglyorum,* the seta 1-S is double, rarely single.

The larva of *Ae. hansfordi* is also extremely similar to that of *Ae. dendrophilus* in having the seta 1-S single, rarely double, but can be distinguished from *dendrophilus* by the seta 1-S inserted slightly beyond the middle of siphon. In *dendrophilus,* the seta 1-S is inserted at middle of siphon.

The pupa of *Ae. hansfordi* is extremely similar to that of *Ae. dendrophilus* in having the paddle margins with distinct denticles, without fringe of long hair-like spicules, the seta 9-VII usually single (1-2), barbed, and in having the paddle apex somewhat pointed. However, *Ae. hansfordi* can be distinguished from *dendrophilus* by seta 9-VIII usually with 4 branches (3-5), and by the male genital lobe, which is about as long as wide. In *dendrophilus*, seta 9-VIII is

usually 3 branches (2-5), and the male genital lobe, which is short and broad, much shorter than wide.

Aedes hansfordi is apparently a widely distributed species that occurs in habitats between <166 and 1,000 m in areas of yearly rainfall of 88.9-190.5 cm.

BIONOMICS. The immature stages of *Ae. hansfordi* have been collected from the following: tree holes in South Africa and Tanzania; bamboo pots placed on trees in forests in South Africa; cut bamboos in Tanzania.

In South Africa, larvae of *Ae. hansfordi* were collected from pow-pow tree and from tree hole near Lab., in Eshowe, Zululand; from bamboo pots in Gwalaweui Jebombo M. near Ingwavuma, Ngome Forest, Zululand and in Dlinza, Eshowe; from bamboo pot placed in coastal scrub forest, in Amanzimtoti near Durban, 0-166 m above sea level and from tree hole in coastal scrub forest. The immature stages of this species have also been collected from bamboo pot that was placed on a tree, about 1.5 m above ground, partially shaded, in Eshowe Office Garden, 520 m above sea level; from bamboo pots that were placed on trees, partially shaded, in forests, in Hlinza Forest, Eshowe district, Ndumu Game Reserve and in Amanzimtoti, Natal.

In Tanzania, larvae of *Ae. hansfordi* were collected from cut bamboos in Amani T.T. and Sigi T.T., and from tree hole in Amani T.T., Tanga Region.

The specimens of *Ae. hansfordi* from Uganda were obtained from females taken biting man from Mongiro, Bwamba County, and larvae reared by A.J. Haddow in 1943.

Preferred ovipositional sites for *Ae. hansfordi* based on the present study were tree holes, bamboo pots that were placed on trees in forests, and cut bamboos. There is little doubt that *Ae. hansfordi* is the most adaptable species in the *dendrophilus* group.

Aedes hansfordi has been found in association with *Ae. demeilloni* in a forest in Eshowe, South Africa. Females of this species have been taken biting man in forests in Uganda.

MEDICAL IMPORTANCE. In Uganda, Rift Valley fever virus has been isolated from wild caught females which were misidentified as *Ae. demeilloni* (Smithburn et al. 1948).

Aedes (Stegomyia) heischi van Someren
(Figs. 9A, B, C, D; 19A,B; 25E,F)

Aedes (Stegomyia) heischi van Someren 1951: 1 (M, F, P, L); Hopkins 1952: 148 (L); Mattingly 1952: 246, 247 (key to adults), 248 (key to larvae) and 1953: 8 (taxonomy), 19 (distribution), 44, 45 (zoogeography); Mattingly and Bruce-Chwatt 1954: 191 (distribution); Worth and de Meillon 1960: 240 (distribution).

FEMALE. *Head.* Proboscis longer than forefemur; maxillary palpus 0.23 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax.* Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow white scales, median white stripe usually indistinct or incomplete in anterior 0.33-0.50 of scutum, reaching to prescutellar area; prescutellar line of narrow white scales present; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral white line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a small patch of broad white scales and a few dark narrow scales dorsally;

upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.5-3.3 length of vein R_{2+3}. *Halter.* With dark and white scales. *Legs* (Fig. 9B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.38-0.42; midfemur anteriorly without a large, median white spot, usually with some pale scales scattered in basal 0.6, sometimes pale scales formed a rather distinct, median white stripe; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.56-0.65 that widens 0.2-0.32 from base; midtibia anteriorly dark; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.14-0.22; foretarsomere 1 with basal 0.12-0.19 white on dorsal surface; foretarsomere 2 with basal 0.25-0.43 white on dorsal surface; midtarsomere 1 with basal 0.18-0.26 white on dorsal surface, with a white stripe on posterior surface, in basal 0.71-0.88; midtarsomere 2 with basal 0.23-0.42 white on dorsal surface, with a white stripe on posterior surface, in basal 0.63-0.92; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.29, 0.25-0.37, and 0.23-0.34; hindtarsomere 4 all white, with a few dark scales at apex on ventral surface; hindtarsomere 5 with basal 0.40-0.67 white on dorsal surface; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple (Fig. 9A). *Abdomen.* Tergum I with white scales on laterotergite; terga II-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sometimes tergum II with basolateral white spots only; sterna III-VII each with a basal white band; segment VIII completely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 2-4 larger setae on apical 0.5; tergum IX as long as broad, apical margin of tergum IX with well developed lateral lobes, each with 4-5 setae; apical margin of postgenital plate without, or with a shallow median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus as long as to slightly shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing.* Cell R_2 about 1.7-2.0 length of vein R_{2+3}. *Legs* (Figs. 9C, D). Fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Abdomen.* Tergum II sometimes with basolateral white spots only. *Genitalia* (Fig. 19A). Gonocoxite 2 times as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (narrows towards apex, broadened at base), with numerous simple setae on the expanded distal portion and bearing 2-3 stout, basally widened spine-like setae on mesal side near the middle; gonostylus simple, elongate, about 0.6 length of gonocoxite, with a short and stout gonostylar claw at apex and with a few setae in apical 0.25; aedeagus strongly toothed, with 2-3 lateral teeth longer than the others; paraproct with a short sternal arm; apical margin of tergum IX deeply concave medially with 4-7 setae on lateral lobe.

PUPA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Abdomen.* Seta 5-IV-VI single, short, not extended beyond posterior margin of following segment; 9-I-IV small, single, simple; 9-V-VI single, simple, slightly stouter than 9-I-IV; 9-VII usually single, simple; 9-VIII usually with 2 branches (2-5) and barbed. *Paddle* (Fig. 25E). Oval, about 1.3 times as long as wide; margins with distinct denticles, without fringe of long hair-like spicules; apex somewhate pointed. Male genital lobe short and broad, shorter than wide.

LARVA. Essentially as in *Ae. mattinglyorum*, with the following diagnostic characters: *Head.* Seta 1-A single, simple. *Thorax.* Basal spine of meso- and metapleural setal groups large and curved (Fig. 25F). *Abdomen.* Seta 1,5-VIII usually with 3 branches (2-3), barbed; 3-VIII usually with 4 branches (3-4), barbed; comb usually with 10(7-12) scales in a row, each scales with a strong, basal denticle on either side of the apical spine, and with a few finer basal

denticles; saddle incomplete, marginal spicules very small and inconspicuous; seta 1-X usually double (1-2), barbed; 2-X usually double (2-3); 3-X single; 4-X with 4 pairs of setae on grid, 4a,b,c,d-X all double. *Siphon.* 1.9 times as long as wide 0.5 from base; usually with 11(9-13) pecten spines, evenly spaced, usually with apical 1 (1-2) spine widely separated from remainder, each spine usually with fine denticles on ventral side, or sometimes on both sides; seta 1-S double, barbed, inserted beyond middle of siphon and before apical pecten spine.

TYPE DATA. *Aedes (Stegomyia) heischi* van Someren, holotype male (Kenya, Taveta, Tree 5, No. 36, 3-1-48), in BMNH; type locality: Taveta (3° 24' S, 37° 40' E), *Coast Region,* KENYA, 3-I-1948. Allotype female (Kenya, Taveta, Tree 3, No. 4, 8-12-47), same data as holotype except 8-XII-1947, in the BMNH. Paratypes: 7 males, 3 females as follows, (MEP Acc. 719): 3 males (Tree 5, No. 29, 40; Tree 8, No. 4; 3-1-48), same data as holotype, with genitalia on slides (90/76, 92/282, 92/283) and 1 female (Tree 3, No. 15, 8-12-47), same data as holotype except 8-XII-1947 [BMNH]; 2 males (Tree 9, No. 4, 11-10-47), same data as holotype except 11-X-1947, with genitalia on slides (92/284, 92/285) and 1 female (Tree 9, No. 1, 28-10-47), same data as holotype except 28-X-1947) [USNM]; (MEP Acc. 808): 1 male (Tree 10, No. 3, 16-12-47), same data as holotype except 16-XII-1947 [DVBD]; 1 male (tree hole, Oct. 1947), same data as holotype except X-1947 [DVBD]; 1 female (tree hole, Dec. 1947), same data as holotype except XII-1947 [DVBD].

In the type series, two paratypes: (MEP Acc. 808): 1 male (Taveta, Tree 10, No. 3, 23-10-47) and 1 female (Taveta, tree hole, Oct. 1947) [DVBD], are not *Ae. heischi.* These two specimens are *Aedes (Stegomyia) soleatus* Edwards.

OTHER MATERIAL EXAMINED. KENYA. *Coast Region*: Taveta (3° 24' S, 37° 40' E), 23-X-1947, 1 M (Tree 10, No. 6), 1 M gen (MEP Acc. 719, 92/286) [BMNH]; Gede (3° 19' S, 40° 01' E), 9-III-1951, W.H.R. Lumsden, 1 M (#1010), 1 M gen (MEP Acc. 719, 92/287) [BMNH]; Kwale (4° 10' S, 39° 32' E), 24-IV-1951, bamboo pot 3, No. 6, 1 M, 1 M gen (MEP Acc. 808, 92/288) [DVBD]; Ganda (3° 13' S, 40° 03' E), VI-1953, 1 M, 1 M gen (MEP Acc. 808, 92/289) [DVBD]; Mombasa (4° 03' S, 49° 40' E), 16-IV-1975, L.P. Lounibos, tree hole, 4 M, 2 F (MEP Acc. 499, KB-15, 17, 19, 19, 20, 23), 3 M gen (MEP Acc. 499, 92/321, 92/322, 92/323) [USNM]; same data, 1 F (MEP Acc. 499, KZ-34) [USNM]; Rabai, Kombeni (3° 58' S, 39° 31' E), 2-16-III-22-IV-1976, L.P. Lounibos, bamboo pot, 2 M, 6 F (MEP Acc. 571, KB-15, 112, 21, 23, 24, 33, 44, 68), 1 M gen, 2 F gen (MEP Acc. 571, 92/324, 95/213, 95/214) [USNM]; same data, 1 F (MEP Acc. 571, KZ-34) [USNM]; same data except 16-III-1976, tree hole, 3 F (MEP Acc. 571, TR-3, 4, 12), 2 F gen (MEP Acc. 571, 95/215, 95/216) [USNM]. *Mombasa, Rabai:* Mazeras (3° 58' S, 39° 33' E), Mazeras Botanic Garden, 21-V-1983, Y.M. Huang, tree hole, 1.5 m above ground, partially shaded, 5 M, 8 F, 13 individual rearings (9 l, 13 p), 2 M gen (MEP Acc. 1035, #158, 95/264, 95/265) [USNM]; same data except 22-V-1983, Y.M. Huang, tree hole, 1.5 m above ground, partially shaded, 2 F, 2 individual rearings (2 l, 2 p) (MEP Acc. 1035, #162) [USNM].

SOUTH AFRICA. *Natal*: Ndumu (26° 55' S, 32° 15' E), 1967, B.M. McIntosh, No. 6861, bamboo pot on tree, 3 M (M542), 1 F (M542), 3 M gen (MEP Acc. 801, 90/74, 92/291, 92/292) [NIV]; Jozini, Makanes Drift (27° 01' S, 32° 16' E), II-1980, Y.M. Huang, bamboo pot on a fig tree along Pongola River, 500 cm above ground, 5 M, 2 F, 7 individual rearings (7 l, 7 p), 5 M gen, 2 F gen (MEP Acc. 806, #109, 95/217, 95/218, 95/329, 95/330, 95/331, 95/219, 95/220) [USNM]; same data except 26-27-II-1980, Y.M. Huang, tree holes, 0.5-1 m above ground, partially shaded, 4 M, 4 F (MEP Acc. 806, #60, #62, #63), 3 M gen (MEP Acc. 806, #62, 90/87, 95/305; #63, 95/306) [USNM]. *Transvaal*: Sibasa, Makonde I (22° 48' S, 30° 32' E), 3-IV-1980, D.L. Theron, bamboo pot placed on tree, 6 M, 4 F, 5 M gen (MEP Acc. 850, #68, 95/321, 95/322, 95/323, 95/324, 95/325) [USNM].

TANZANIA. *Tanga Region*: Gonja (4° 47' S, 38° 33' E), Tanganyika, date unspecified, E.C. Hancock, tree hole, 1 M, 1 M gen (MEP Acc. 808, 92/290) [DVBD].

DISTRIBUTION (Map 5). This species is known from Kenya, South Africa and Tanzania. Mattingly and Bruce-Chwatt (1954: 191) recorded *Ae. heischi* from Mombo (4° 52' S, 38° 14' E), Tanzania [as Tanganyika], and Worth and de Meillon (1960: 240) recorded it from Mozambique, but I have not seen these specimens.

Based on the present collection data, *Ae. heischi* occurs mainly along the coast of Kenya. It is found from Ganda in the northeast, through Gede, Kombeni, Mazeras to Mombasa in the southeast, to Kwale in the southwest and to Taveta in the northwest. It is also found in the northeast corner of Tanzania (Tanga Region).

In South Africa, it occurs from the northern Transvaal (Makonde I) and from northern Natal (Ndumu and Makanes Drift).

TAXONOMIC DISCUSSION. *Aedes heischi* has the scutum with an anterior median white spot of narrow scales, hindfemur with a distinct white knee-spot, hindtibia with a white longitudinal stripe on ventral surface in basal 0.14-0.22, hindtarsomere 3 with basal 0.23-0.34 white on dorsal surface, hindtarsomere 4 all white on dorsal surface, female fore- and midlegs with tarsal claws equal and toothed, male fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple, and hindleg with tarsal claws equal and simple, and thus can be distinguished easily from all other species of the *dendrophilus* group except *Ae. demeilloni.* However, *Ae. heischi* differs from *demeilloni* by the midtarsomeres 1 and 2 with a well-marked white stripe on posterior surface, and by the hindtarsomere 5 with basal 0.4-0.67 white on dorsal surface. In *demeilloni*, midtarsomeres 1 and 2 have no well-marked white stripe on the posterior surface, and the hindtarsomere 5 is all white, or all white except tip.

The adult male and female of *Ae. heischi* are also extremely similar to those of *Ae. segermanae*, but can be distinguished from *segermanae* by the diagnostic characters mentioned under the discussion of *segermanae.*

The male genitalia of *Ae. heischi* are extremely similar to those of *Ae. demeilloni* in having the claspette with distal expanded portion oval in dorsal aspect (narrows towards apex, broadened at base), but can be distinguished from those of *demeilloni* by the claspette, which has numerous simple setae on the expanded distal portion and bearing 2-3 stout, basally widened spine-like setae on mesal side near the middle.

The larva of *Ae. heischi* (Figs. 19B; 25F) is extremely similar to that of *demeilloni* with similar comb scales and pecten spines, but can be distinguished from *demeilloni* by the diagnostic character mentioned under the discussion of *demeilloni.* The larva of *heischi* is also extremely similar to that of *Ae. keniensis* in having the comb scale appearing trifid, the pecten spine (triangular spines) and in having seta 3-X single. However, *Ae. heischi* can be distinguished from *keniensis* by the basal spine of meso- and metapleural setal groups, which is large and curved.

The pupa of *Ae. heischi* is extremely similar to those of *Ae. dendrophilus* and *Ae. hansfordi*, but can be distinguished from *dendrophilus* and *hansfordi* by seta 9-VII usually single, simple, and by the seta 9-VIII usually with 2 branches (2-5).

Aedes heischi is apparently an East African Lowland species that occurs in habitats between <166 and 1,166 m in areas of yearly rainfall of 76.2-127 cm.

REMARKS. Muspratt (1956: 60) assigned the specimens from Magoeba's Kloof, New Agatha, Louis Trichardt district and Zoutpansberg range, South Africa to *Ae. heischi.* However, they differ in details of ornamentation from *heischi* and do not seem to belong to this species. They appear to represent a distinct species. This problem cannot be resolved until adequate specimens (individual rearings, progeny rearings) are obtained.

BIONOMICS. Type specimens of *Ae. heischi* were obtained from larvae found in tree holes from Taveta, Kenya. The immature stages of this species were also collected from tree holes and bamboo pots in coastal Kenya (Ganda, Gede, Kombeni, Mazeras, Mombasa and Kwale), and from tree hole in Gonja, Tanga Region, Tangania.

In South Africa, the immature stages of *heischi* have been collected from tree holes in Makanes Drift, Natal, and from bamboo pots that were placed on trees in Ndumu and Makanes Drift, Natal and in Makonde I, Transvaal.

Mattingly (1953: 28) reported that "*Aedes heischi*. Known only from tree-holes (E.C.C. van Someren, 1951)."

Preferred ovipositional sites for *Ae. heischi* based on the present study were tree holes and bamboo pots that were placed on trees in forests.

Aedes heischi has been collected with *Ae. demeilloni* from a bamboo pot (MEP Acc. 806, #109) that was placed on a fig tree along the Pongola River in Makanes Drift, Natal, South Africa. It has also been found in association with *Ae. soleatus* from Taveta, Kenya.

Mattingly (1953: 31) stated that the female of *heischi* has not been recorded as biting man.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) keniensis van Someren
(Figs. 10A, B, C, D; 11C; 20A)

Aedes (Stegomyia) keniensis van Someren 1946a: 111 (M, F, L*); Garnham 1949: 490 (bionomics); Hopkins 1952: 151 (L*); Mattingly 1952: 246 (key to adults), 248 (key to larvae) and 1953: 7, 8 (taxonomy), 19 (distribution), 32, 33, 42, 44 (zoogeography).

FEMALE. *Head.* Proboscis longer than forefemur; maxillary palpus 0.17-0.2 length of proboscis; pedicel covered with white scales except on dorsal and ventral surfaces; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 11C). Scutum with narrow dark scales, and a distinct median white spot of broad scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow pale yellow scales, median yellow stripe usually broader and paler posteriorly, reaching to prescutellar area; prescutellar line of narrow white scales not present, with only a few narrow pale scales; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral white line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and without a few broad dark scales at apex of midlobe; postpronotum with a small patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.2-2.4 length of vein R_{2+3}. *Halter.* With dark and white scales. *Legs* (Fig. 10C). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.4; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.60 that widens 0.25 from base; mid- and hindtibiae all dark; foretarsomere 1 with basal 0.18-0.21 white on dorsal surface; foretarsomere 2 with basal 0.33-0.37 white on dorsal surface; midtarsomere 1 with basal 0.22-0.29 white on dorsal surface;

midtarsomere 2 with basal 0.4-0.42 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.25-0.31, 0.24-0.32, and 0.20-0.25; hindtarsomere 4 all white; hindtarsomere 5 all dark; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple (Fig. 10D). *Abdomen.* Tergum I with white scales on laterotergite; tergum II with basolateral white spots; terga III-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sterna III-VII each with a basal white band; segment VIII completely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 5 larger setae on apical 0.4; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 6-7 setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus slightly shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing.* Cell R_2 about 1.9-2.1 length of vein R_{2+3}. *Legs* (Figs. 10A, B). Fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Abdomen.* Tergum II with a basal white band and basolateral white spots which do not connect with the basal white band; sterna III-VI each with a basal white band. *Genitalia* (Fig. 20A). Gonocoxite 2.1 times as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (lateral side rather straight, with mesal side rounded), with numerous simple setae on the expanded distal portion and bearing 3-4 stout, basally widened spine-like setae on mesal side; gonostylus simple, elongate, about 0.6 length of gonocoxite, with a short stout gonostylar claw at apex and with a few setae in apical 0.25; aedeagus strongly toothed; paraproct with a sternal arm; apical margin of tergum IX deeply concave medially with 8-10 setae on lateral lobe.

PUPA. Unknown.

LARVA. Detailed descriptions will be given when adequate specimens are available.

The larva of *Ae. keniensis* was described by van Someren (1946a) and Hopkins (1952). The following diagnostic characters of *keniensis* are derived from van Someren (1946a) and Hopkins (1952).

The larva of *Ae. keniensis* resembles that of *Ae. demeilloni* in having a similar shaped comb scale (with small secondary denticles at the base, 2 of them longer and stouter than the rest, giving the scale a trifid appearance) and the pecten spine (triangular spines) with fine ventral denticles and sometimes a few dorsally (van Someren 1946a: 112), but can be distinguished from *demeilloni* by the seta 3-X, which is single. The larva of *Ae. keniensis* has an even greater resemblance to *Ae. heischi*, however, *Ae. keniensis* can be distinguished from *heischi* by the basal spine of meso- and metapleural setal groups, which is smaller (Mattingly, noted in Hopkins 1952: 151).

TYPE DATA. *Aedes (Stegomyia) keniensis* van Someren, holotype male (Kenya, Nairobi, 1-11-37, tree hole, E.C.C. van Someren, B.M., 1947-195), with genitalia on a slide, in BMNH; type locality: City Park, Nairobi (1° 17' S, 36° 50' E), *Nairobi Area*, KENYA, 1-XI-1937 (E.C.C. van Someren). Allotype female, same data as holotype male, in the BMNH.

OTHER MATERIAL EXAMINED. KENYA. *Nairobi Area*: Nairobi (1° 17' S, 36° 50' E), IV-1924, Dr. van Someren, (B.M., 1925-33), 2 F [BMNH]; same data except 1-XI-1937, E.C.C. van Someren, (B.M., 1947-195), tree hole, N2 No4, 1 F, 1 F gen (MEP Acc. 719, 95/196) [BMNH]; same data except date unspecified, E.C.C. van Someren, 1 F (F. 92) [BMNH]; same data except date unspecified, 1 M (MEP Acc. 726/ LF. 18, identified as *keniensis*), 1 M gen (MEP Acc. 726, 79/200) [LSHTM]; same data except 1-XI-1937, tree holes, N1 No5, N1 No13,

2 M, 1 M gen (MEP Acc. 808, 95/194) [DVBD]; same data except 1-X-1937, tree hole, N1 No16, 1 M, 1 M gen (MEP Acc. 1036, 95/195) [DVBD].

DISTRIBUTION (Map 1). This species is known only from Kenya. *Aedes keniensis* is found in the inland Nairobi area (City Park, Langata Forest).

TAXONOMIC DISCUSSION. *Aedes keniensis* differs from congeners of the *dendrophilus* group by: (1) scutum with anterior median white spot of broad scales; (2) hindfemur with a distinct white knee-spot; (3) hindtibia without a white longitudinal stripe on ventral surface in basal area; (4) hindtarsomere 3 with basal 0.2-0.25 white on dorsal surface; (5) hindtarsomere 4 all white; and (6) hindtarsomere 5 all dark.

The adult male and female of *Ae. keniensis* are extremely similar to those of *Ae. masseyi*, but can be distinguished easily from *masseyi* by the scutum with anterior median white spot of broad scales, and by the hindtarsomere 3 with basal 0.2-0.25 white on dorsal surface. In *masseyi*, the scutum has anterior median white spot of narrow scales, and the hindtarsomere 3 is all dark.

The adult male and female of *Ae. keniensis* are also extremely similar to that of *Ae. njombiensis*, but can be distinguished from *njombiensis* by the diagnostic character mentioned under the discussion of *njombiensis.*

The male genitalia of *Ae. keniensis* are differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion oval in dorsal aspect (lateral side rather straight, with mesal side rounded), with numerous simple setae on the expanded distal portion and bearing 3-4 stout, basally widened spine-like setae on the mesal side, and by the gonostylar claw which is short and stout.

Aedes keniensis is apparently an East African Highland species that occurs in habitats at 1,833 m in areas of yearly rainfall of 88.9 cm.

BIONOMICS. Larvae of type specimens were collected from tree holes in City Park, Nairobi, Kenya.

Mattingly (1953: 28) reported that "*Aedes keniensis.* Known only from tree-holes (E.C.C. van Someren, 1946a)."

Mattingly (1953: 30) reported "*Aedes keniensis.* In a long series of catches in the Langata Forest Garnham (1949) took only one specimen biting."

Aedes keniensis has been found in association with *Ae. njombiensis* from Nairobi, Kenya.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) kenyae van Someren
(Figs. 3C; 4A; 16B)

Aedes (Stegomyia) bambusae ssp. *kenyae* van Someren 1946b: 2 (M, F); Garnham et al 1946: 483 (bionomics); Hopkins 1952: 155 (L); Mattingly 1952: 247 (key to adults), 249 (key to larvae) and 1953: 14 (taxonomy), 21 (distribution), 43 (zoogeography).

FEMALE. *Head.* Proboscis slightly shorter than forefemur; maxillary palpus 0.21-0.25 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax.* Scutum with narrow dark scales, and a distinct median pale yellow spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow pale yellow scales, median pale yellow stripe connected with anterior median spot, reaching to prescutellar

area; prescutellar line well developed, with narrow pale yellow scales, connecting with median longitudinal stripe at anterior margin of prescutellar area; fossal area with a large patch of broader crescent-shaped pale yellow scales, fossal pale yellow patch with anterior end extending along scutal margin towards the anterior median pale yellow spot; posterior dorsocentral yellow line of narrow scales present, reaching forward to the posterior end of fossal pale yellow patch; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a small patch of broad white scales and some dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.6-4.0 length of vein R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 4A). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.33-0.42; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.53-0.58 that widens 0.36-0.39 from base; midtibia anteriorly dark, with a basal white spot on posterior surface; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.31-0.35; foretarsomere 1 with basal 0.10-0.17 white on dorsal surface; foretarsomere 2 with basal 0.35-0.36 white on dorsal surface; midtarsomere 1 with basal 0.14-0.22 white on dorsal surface; midtarsomere 2 with basal 0.77 to all white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.2-0.23, 0.21-0.28 and 0.16-0.19; hindtarsomere 4 all white; hindtarsomere 5 with basal 0.47-0.88 white on dorsal surface; fore-, mid- and hindlegs with tarsal claws equal, all toothed. *Abdomen.* Tergum I with white scales on laterotergite; tergum II with basolateral white spots; terga III-VII each with a basal pale yellow band and basolateral white spots which do not connect with the basal pale yellow band; sterna III-VII each with a basal white band; segment VIII largely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 3-4 larger setae on apical 0.5; tergum IX longer than broad, apical margin of tergum IX with well developed lateral lobes, each with 2-4 setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus as long as proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing.* Cell R_2 2.1-2.2 length of vein R_{2+3}. *Legs* (Fig. 3C). Foretarsomere 2 with basal 0.1-0.12 white on dorsal surface; midtarsomere 2 with basal 0.56-0.85 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.24-0.25, 0.2-0.23 and 0.11-0.15; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Genitalia* (Fig. 16B). Gonocoxite 2.5 times as long as wide; claspette large, lobed, distal expanded portion square in dorsal aspect (narrows towards apicolateral angle, with basolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 3 (2-3) strong, basally widened spine-like setae on apicomesal angle; gonostylus simple, elongate, about 0.6 length of gonocoxite, with a long slender gonostylar claw at apex and with a few setae in apical 0.5; aedeagus with all rather short teeth; paraproct with a sternal arm; apical margin of tergum IX concave medially with 6-12 setae on lateral lobe.

PUPA. Unknown.

LARVA. Detailed descriptions will be given when adequate specimens are available. The larva of *Ae. kenyae* (as ssp. *kenyae*) was described by van Someren in Hopkins (1952). The following diagnostic characters of *kenyae* are derived from Hopkins (1952).

The larva of *Ae. kenyae* is very similar to those of *Ae. bambusae* and *Ae. deboeri* with similar comb scales and pecten spines, but can be distinguished from *bambusae* and *deboeri* by the seta 1-S, which is single, barbed, and inserted at middle of siphon and by the grouping of the pecten spines (Hopkins 1952: 155).

The larva of *Ae. kenyae* can be distinguished from those of *Ae. amaltheus, bambusae, deboeri, demeilloni, dendrophilus, hansfordi, heischi, keniensis* and *mattinglyorum* by the peculiar grouping of the pecten spines (the spines are irregularly spaced and placed in groups of 1-5, the spines in each group set very close together and almost overlapping) (Hopkins 1952: 155).

TYPE DATA. *Aedes (Stegomyia) bambusae kenyae* van Someren, holotype male (Kenya, Kaimosi, 11-6-43, Tree hole No. X, Kenya: E.C.C. van Someren, B.M., 1947-195), with genitalia on slide (SAMP Acc. 1587, 93/105), in BMNH; type locality: Kaimosi (0° 05' N, 34° 50' E), North Kavirondo, *Western Region,* KENYA, 11-VI-1943 (E.C.C. van Someren). Allotype female (Kenya, Kaimosi, 12-6-43, Tree hole No. 6), same data as holotype male, in the BMNH. Paratype male (Kenya, Kisii (0° 41' S, 34° 47' E), Aug. 43, Kenya: E.C.C. van Someren, B.M., 1947-195), with genitalia on a plastic plate, in the BMNH.

OTHER MATERIAL EXAMINED. KENYA. *Rift Valley Region:* Elgeyo Escarpment (1° 00' N, 35° 10' E), 2,666 m, 9-VIII-1926, R. Harger, 1 M, 1 M gen (MEP Acc. 719, 92/538) [BMNH]; Kaption (0° 42' N, 35° 44' E), 19-VII-1946, 1 M (No. 6), 1 F (No. 7), 1 M gen, 1 F gen (MEP Acc. 808, 92/539, 92/540) [DVBD]; same data except 23-VII-1946, 2 M (No. 9 & No. 10), 1 F (No. 8), 2 M gen (MEP Acc. 808, 92/541, 92/542) [DVBD]; Kencloust Cheborget (0° 35' S, 35° 10' E), 1951, 1 M, 1 M gen (MEP Acc. 808, 92/543) [DVBD]. *Nyanza Region*: Kisii (0° 41' S, 34° 47' E), VIII-1943, 1 F (MEP Acc. 725) [CMT]; same data, 4 F, 3 F gen (MEP Acc. 808, 92/544, 92/545, 95/201) [DVBD]; Muhoroni (0° 09' S, 35° 12' E), tree hole, 19-IX-1951, 1 M, 1 M gen (MEP Acc. 808, 92/546) [DVBD].

DISTRIBUTION (Map 2). This species is known only from Kenya. *Aedes kenyae* occurs mainly in the western part of Kenya. It is found from Kaimosi in the west, to Elgeyo Escarpment in the north, to Kaption in the northeast, to Muhoroni in the east, to Cheborget in the southeast and to Kisii in the southwest.

TAXONOMIC DISCUSSION. *Aedes kenyae* differs from congeners of the *dendrophilus* group by: (1) white knee-spot present on hindfemur; (2) hindtibia with a white longitudinal stripe on ventral surface in basal 0.31-0.35; (3) hindtarsomere 3 with basal 0.11-0.19 white on dorsal surface; (4) hindtarsomere 4 all white; (5) hindtarsomere 5 with basal 0.47-0.88 white on dorsal surface; (6) female fore- and midlegs with tarsal claws equal and toothed; (7) male fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple; and (8) hindleg with tarsal claws equal and toothed.

Adults of *Ae. kenyae* closely resemble those of *Ae. bambusae* and *Ae. muroafcete* in the scutal markings but can be distinguished from *bambusae* and *muroafcete* by the hindfemur with a distinct white knee-spot. This same character state of *Ae. kenyae* is extremely similar to those of *Ae. deboeri.* However, *Ae. kenyae* can be distinguished easily from *deboeri* by the hindtarsomere 5 with basal 0.47-0.88 white on dorsal surface. In *deboeri,* the hindtarsomere 5 is all dark.

The male genitalia of *Ae. kenyae* are differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion square in dorsal aspect (narrows towards apicolateral angle, with basolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 3 (2-3) strong, basally widened spine-like setae on the apicomesal angle.

Aedes kenyae is apparently an East African montane forest species that occurs in habitats between 1,433 and 2,666 m in areas of yearly rainfall of 114.3-177.8 cm.

BIONOMICS. Larvae of *Ae. kenyae* were collected from tree holes in Kaimosi and Muhoroni, western part of Kenya.

Mattingly (1953: 29) reported that "*Aedes bambusae* ssp. *kenyae.* Tree-holes, rock holes and bamboo pots (Garnham et al., 1946)."

Garnham et al. (1946) reported that larvae of *Ae. kenyae* (as *bambusae kenyae*) were obtained from bamboo pots at heights up to 20 m. A few adults were taken biting in the Kaimosi Forest and some adults were taken in houses at Kisii.

Mattingly (1953: 43) noted that *Ae. kenyae* is restricted to wetter western part of Kenya, while *Ae. deboeri* is known only from the drier eastern part.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) masseyi Edwards
(Figs. 12A, B, C, D, E; 20B)

Aedes (Stegomyia) masseyi Edwards 1923: 397 (F); Edwards 1925: 266 (F); Edwards 1941: 146 (F*); Mattingly 1952: 246 (key to adults) and 1953: 7, 8 (taxonomy), 19 (distribution), 32, 33 (zoogeography); Mattingly and Lips (1953: 322) (? L*); van Someren 1972: 91 (M, F).

FEMALE. *Head.* Proboscis longer than forefemur; maxillary palpus 0.15-0.2 length of proboscis; pedicel covered with white scales except on dorsal and ventral surfaces; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 12A). Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow yellow scales, median yellow stripe connected with anterior median white spot, reaching to prescutellar area; prescutellar line of narrow white scales not present; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral yellow line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.6-3.2 length of vein R_{2+3}. *Halter.* With dark and white scales. *Legs* (Fig. 12B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.4; midfemur anteriorly without a large, median white spot, (type female with some pale scales scattered); hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.57-0.63 that widens 0.29 from base; mid- and hindtibiae all dark; foretarsomere 1 with basal 0.18-0.24 white on dorsal surface; foretarsomere 2 with basal 0.33-0.35 white on dorsal surface; midtarsomere 1 with basal 0.29-0.36 white on dorsal surface; midtarsomere 2 with basal 0.4-0.45 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1, 2, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.28-0.36 and 0.20-0.33; hindtarsomeres 3, 5 all dark; hindtarsomere 4 all white; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple (Fig. 12D). *Abdomen.* Tergum I with white scales on laterotergite; terga II-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; tergum II sometimes with basolateral white spots only; sterna III-VII each with a basal white

band; segment VIII completely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 4 larger setae on apical 0.4; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 4-5 setae; apical margin of postgenital plate without a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus shorter than proboscis (0.915 length of proboscis), predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing.* Cell R_2 1.8 length of vein R_{2+3}. *Legs* (Figs. 12C, E). Fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Abdomen.* Tergum II with basolateral white spots only. *Genitalia* (Fig. 20B). Gonocoxite 2.1 times as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (narrows towards apex, broadened at base), with numerous simple setae on the expanded distal portion and bearing 3-4 stout, basally widened spine-like setae on mesal side; gonostylus simple, elongate, about 0.56 length of gonocoxite, with a short and somewhat blunt gonostylar claw at apex and with a few setae in apical 0.25; aedeagus strongly toothed; paraproct with a sternal arm; apical margin of tergum IX deeply concave medially with 5 setae on lateral lobe.

PUPA and LARVA. Unknown.

The larva of *Ae. masseyi* is not known with certainty but Mattingly and Lips (1953: 322) assigned two unassociated larvae from Elisabethville to *masseyi* with some assurance owing to their resemblance to that of *Ae. keniensis.* They differ from *keniensis* in the form of the pecten spines and a very short unbranched Seta 1-X. These larvae from Elisabethville have an even greater resemblance to that of *Ae. amaltheus* with similar comb scales and pecten spines, however, they can be distinguished from *amaltheus* by seta 1-X, which is very short and single. In *amaltheus,* seta 1-X is strongly branched (5-6 branches).

TYPE DATA. *Aedes (Stegomyia) masseyi* Edwards, holotype female (Ruwe, Congo Free State, 8. V. 1907, Dr. A Yale Massey, 1907, 279, "In house"), in BMNH; type locality: Ruwe (10° 41' S, 25° 35' E), *Lualaba,* ZAIRE (Belgian Congo), 8-V-1907 (Dr. A. Yale Massey).

OTHER MATERIAL EXAMINED. TANZANIA. *Mbeya Region*: Mbeya (8° 50' S, 33° 15' E), Tanganyika, 30-XII-1970, A. McCrae, bamboo, 1 M (with male genitalia on a plastic plate), (I have remounted the male genitalia on a slide), 1 M gen (MEP Acc. 808, 95/204), 1 F, 1 F gen (MEP Acc. 808, 95/197) [DVBD]; same data, 4 F [DVBD].

ZAIRE. *Lualaba*: Ruwe, Congo Free State, 7-V-1907, Dr. A. Yale Massey, (1907-279), "In house", 1 F [BMNH]; same data except sheffield Neave, date unspecified, 1 F [BMNH]. *Katanga-Oriental*: Elisabethville (11° 40' S, 27° 34' E), XI-1929, Ch. Seydel, (B.M., 1931-146), 1 F (MEP Acc. 719) [BMNH].

ZAMBIA. Lake Young (11° 14' S, 31° 44' E), (N.E. Rhodesia, near Lake Young), II-1905, R.L. Harger, (1912-456), 1 F (MEP Acc. 778) [BMNH].

DISTRIBUTION (Map 1). This species is known from Tanzania, Zaire and Zambia. *Aedes masseyi* occurs in the southwestern part of Tanzania (Mbeya), in the northeastern part of Zambia (Lake Young) and in the southeastern part of Zaire (Ruwe, Elisabethville).

TAXONOMIC DISCUSSION. *Aedes masseyi* has the scutum with an anterior median white spot of narrow scales, hindfemur with a distinct white knee-spot, hindtibia without a white longitudinal stripe on ventral surface in basal area, hindtarsomere 4 all white, and hindtarsomeres 3 and 5 all dark, and thus can be distinguished easily from all other species of the *dendrophilus* group except *Ae. amaltheus. Aedes masseyi* can be distinguished from *amaltheus* by the diagnostic characters mentioned under the discussion of *amaltheus.*

Adults of *Ae. masseyi* are extremely similar to that of *Ae. njombiensis,* but can be distinguished from *njombiensis* by the diagnostic character mentioned under the discussion of

njombiensis.

The male genitalia of *Ae. masseyi* are differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion oval in dorsal aspect (narrows towards apex, broadened at base), with numerous simple setae on the expanded distal portion and bearing 3-4 stout, basally widened spine-like setae on the mesal side, and by the gonostylar claw which is short and somewhat blunt.

Aedes masseyi is closely related and similar to *amaltheus* suggests a close affinities with *amaltheus*.

Aedes masseyi is apparently a highland species that occurs in habitats between 1,333 and 1,933 m in areas of yearly rainfall of 88.9-127 cm.

BIONOMICS. The specimens of *Ae. masseyi* from Tanzania were obtained from larvae found in a cut bamboo at Mbeya (van Someren 1972).

Mattingly (1953: 30) reported "*Aedes masseyi.* It seems probable that adults in the British Museum were taken biting."

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) mattinglyorum Huang
(Figs. 13A, B, C, D, E; 21A, B, C; 22)

Aedes (Stegomyia) mattinglyorum Huang 1994: 11 (M*, F*, L*, P*).

FEMALE. *Head.* Proboscis longer than forefemur; maxillary palpus 0.19-0.22 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 13A). Scutum with narrow dark scales, and a distinct median white spot of broad scales on anterior promontory, with a short median longitudinal stripe of narrow white scales, extended to prescutellar area, absent on anterior 0.5-0.6 of scutum; prescutellar line of narrow white scales usually not present, with only a few narrow white scales; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral white line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a small patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch; lower mesepimeral scale patch much reduced, or absent. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 3.4-3.7 length of vein R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 13B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.17-0.33; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.57-0.62 that widens 0.22-0.29 from base; midtibia anteriorly dark, with a basal white spot on posterior surface; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.31-0.42; foretarsomere 1 with basal 0.10-0.18 white on dorsal surface; foretarsomere 2 with basal 0.26-0.39 white on dorsal surface; midtarsomere 1 with basal 0.15-0.29 white on dorsal surface; midtarsomere 2 with basal 0.86-0.97 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-5, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.21-0.30, 0.26-0.34 0.27-0.33, 0.82-0.91 and 0.70-0.77; fore- and midlegs with tarsal claws equal, all toothed; hindleg

with tarsal claws equal, both simple (Fig. 13D). *Abdomen.* Tergum I with white scales on laterotergite; tergua II-III with basolateral white spots; terga IV-VII each with a basal white band and basolateral white spots that do not connect with the basal white band; basal white band on terga VI-VII usually rather long, extended to 0.5-0.6 length of tergum; sterna III-VII each with a basal white band; segment VIII largely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 3-5 larger setae on apical 0.5; tergum IX as long as broad, apical margin of tergum IX with well developed lateral lobes, each with 5-9 setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4, 5 dorsally incomplete. *Thorax.* Prescutellar line of narrow white scales usually present; sometimes supraalar area with a large patch of narrow white scales and reaching to posterior dorsocentral white line. *Wing.* Cell R_2 1.7-2.5 length of vein R_{2+3}. *Legs* (Fig. 13C). Midtarsomere 2 with basal 0.91-0.96 white on dorsal surface; hindtarsomere 4 with basal 0.65-0.84 white on dorsal surface; hindtarsomere 5 with basal 0.60-0.82 white on dorsal surface; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple (Fig. 13E). *Abdomen.* Tergum III sometimes with a basal white band and basolateral white spots which do not connect with the basal white band. *Genitalia* (Fig. 21C). Gonocoxite 2.2 times as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (lateral and mesal sides more or less parallel), with numerous simple setae on the expanded distal portion and bearing 1 strong, basally widened spine-like seta on basomesal corner; gonostylus simple, elongate, about 0.7 length of gonocoxite, with a long slender gonostylar claw at apex and with a few setae in apical 0.60; aedeagus strongly toothed; paraproct with a sternal arm; apical margin of tergum IX deeply concave medially with 8-12 setae on lateral lobe.

PUPA (Figs. 21A, B). *Cephalothorax.* Trumpet about 3.3 times as long as wide (width measured 0.5 from base); setae 1,3-CT single, longer than 2-CT; 2-CT single; 4-CT usually single (1-2); 5-CT usually double (1-3); 6-CT single, stout, slightly longer than 7-CT; 7,8-CT usually single (1-2); 9-CT single, longer than 8-CT; 10-CT usually single (1-2), barbed, caudomesad of 11-CT; 11-CT single, stout; 12-CT usually double (1-2). *Abdomen.* Seta 1-I well developed, with more than 10 dendritic branches; 2-I single; 3-I single, long; 2-I and 3-I widely separated, distance between their bases about 1.5 times distance between those of 4-I and 5-I; seta 1-II usually double (2-4), barbed; 3-II,III usually single (1-2); 1-III usually single (1-3); 1-IV usually double (1-2); 2-IV,V anteromesad of 1-IV,V respectively; 5-IV-VI usually single (1-2), short, not extended beyond posterior margin of following segment; seta 9-I-II small, single, simple; 9-III-VI single, simple; 9-VII usually double (1-2) and barbed; 9-VII, VIII much longer and stouter than 9-I-VI; 9-VIII usually with 4 branches (3-7) and barbed. *Paddle.* Oval, about 1.3 times as long as wide; margins with distinct denticles, without fringe of long hair-like spicules; apex rounded; seta 1-P single, short. Male genital lobe about as long as wide.

LARVA (Fig. 22). *Head.* Antenna short, less than 0.5 length of head, without spicules; seta 1-A inserted in apical 0.5 of shaft, single; inner mouthbrushes apically pectinate; seta 4-C well developed, usually with 4 branches (3-6), anteromesad of 6-C; 5-C usually single (1-2), long, barbed; 6-C usually single (1-2); 7-C usually double (1-2); 8-10,13-C single; 11-C usually double (2-3), barbed; 12-C usually double (2-4); 14-C usually 3-branched (2-6), barbed; 15-C usually 3-branched (2-3); mentum usually with 11 (10-12) teeth on each side of central tooth. *Thorax.* Seta 1-P usually 3-branched (2-4), barbed; 2-P single; 3,4-P usually double (2-3); 5-P usually double (2-4), barbed; 6-P single, barbed; 7-P usually double (2-3), barbed; 9-P usually single (1-2); 11-P double; 14-P usually double (2-3); 5,7-M single, barbed; 6-M usually

3-branched (2-3), barbed; 8-M usually 3-branched (3-4), barbed; 9-M double, barbed; 10,12-M single, long, stout and barbed; 11-M single, small; 7-T usually with 4 branches (4-5), barbed; 9-T double, barbed; 10,11-T similar to those on mesothorax; 12-T much reduced, single and simple; basal spine of meso- and metapleural setal groups long, straight, pointed at tip. *Abdomen.* Seta 6-I usually 3-branched (2-4), barbed; 7-I single, barbed; 6-II usually double (2-3), barbed; 6-III-VI double, barbed; 7-II usually single (1-2), barbed; 1-VII double, barbed; 2-VII usually single (1-2); 2-VIII distant from 1-VIII; 1,5-VIII usually double (2-3), barbed; 3-VIII usually with 4 branches (3-5), barbed; 2,4-VIII single; comb with 9-10 scales in a row, each scale with free portion widened at base and sharply pointed at apex, and with fine denticles basal of apical spine; saddle incomplete, marginal spicules very small and inconspicuous; seta 1-X double, barbed; 2-X double; 3-X single; 4-X with 4 pairs of setae on grid, 4a,b,c-X double, 4d-X usually double (1-2); no precratal tufts; anal papillae subequal, about 2.0 times length of saddle, sausage-like. *Siphon.* 2.4 times as long as wide 0.5 from base, acus absent; usually with 12 (11-17) pecten spines, evenly spaced, with apical 1-2 spines widely separated from remainder, each spine usually with fine denticles on ventral side, or sometimes on both sides; seta 1-S usually double, rarely single, barbed, inserted at middle of siphon and before apical pecten spine.

TYPE DATA. *Aedes (Stegomyia) mattinglyorum* Huang, holotype male (SAMP Acc. 1093/Sierra Leone 1984, #30-26, Y.M. Huang), with associated larval and pupal skins on slide, with genitalia on slide (92/399), in Smithsonian Institution Washington, D.C. [USNM]; type locality: Tiwai Island (7° 30' N, 11° 20' W) (on the Moa River), Potoru, *Southern Province*, SIERRA LEONE, 7-V-1984 (Y.M. Huang). Paratypes: 7 males, 7 females and 1 4th instar larva as follows, (SAMP Acc. 1093): 3 males (#30-12, 13, 29), with associated larval and pupal skins on slides, with genitalia on slides (92/398, 92/192, 92/193) and 5 females (#30-23, 24, 25, 27, 28), with associated larval and pupal skins on slides, with genitalia on slides (92/194, 92/195), same data as holotype [USNM]; 1 male (#30-21), with associated larval skin on slide, with genitalia on slide (92/196) and 1 female (#30-22), with associated larval skin on slide, same data as holotype [USNM]; 3 males (#30-101, 102, 103), with associated pupal skins on slides, with genitalia on slides (92/197, 92/198, 92/199) and 1 female (#30-106), with associated pupal skin on slide, same data as holotype [USNM]; 1 4th instar larvae (#30), same data as holotype [USNM].

OTHER MATERIAL EXAMINED. GHANA. *Eastern Region*: Nsawam (5° 48' N, 0° 20' W), Gold Coast, 14-IV-1920, Dr. A. Ingram, (B.M., 1920-227), from larvae in rot hole in Cotton tree, 1 F (MEP Acc. 719) [BMNH]; Aburi (5° 51' N, 0° 10' W), Gold Coast, 6-VI-1920, Dr. A. Ingram, (B.M., 1921-45), banana, 1 F (MEP Acc. 719) [BMNH]. *Accra Region*: Accra (5° 33' N, 0° 13' W), Gold Coast, 1920-23, J.W.S. Macfie, 1 M (#77), 2 F (#78, #80), 1 M gen (MEP Acc. 719, 92/184) [BMNH]; same data, 1 M, 1 F, 1 M gen (MEP Acc. 719, 92/185) [BMNH]; same data, 1 M, 1 M gen (MEP Acc. 808, 92/190) [DVBD]; same data, 1 M, 1 M gen (MEP Acc. 1036, 92/191) [DVBD].

IVORY COAST. *Sud, Departement du*: Abidjan (5° 19' N, 4° 02' W), 4-5-VI-1959, J. Hamon, 2 F (MEP Acc. 724) [ORSTOM]; same data except 2-V-1985, Y.M. Huang, plastic bottles placed on trees, 1.0-1.5 m above ground (IV 7, IV 28), partially shaded, in forest, 3 M, 1 F, 4 individual rearings (4 l, 4 p), 1 L, 1 M gen (SAMP Acc. 1138, IV 7, 92/613) [USNM]; Daine (6° 29' N, 8° 32' W), 24-III-1960, J. Hamon, tree hole, 1 M, 1 M gen (MEP Acc. 724, 92/187) [ORSTOM]; Eremankono (5° 33' N, 5° 22' W), 8-VIII-1963, J. Hamon & Brengues, 1 F (MEP Acc. 724) [ORSTOM]; Tiassale (6° 02' N, 4° 50' W), VI-1965, J. Hamon, 1 F (MEP Acc. 724) [ORSTOM]; Tiassale, Ville (4° 38' N, 6° 55' W), 16-VI-1965, J. Hamon, light trap, 1 F (MEP Acc. 724) [ORSTOM]. *Est, Departement de l'*: Bondoukou, Goli (8° 04'N, 2° 51' W), 14-VI-1967, J. Hamon & G. Pichon, 1 M (MEP Acc. 724) [ORSTOM]; Tangamourou, Tanda

(7° 36' N, 3° 12' W), 15-VI-1967, J. Hamon & G. Pichon, 1 F (MEP Acc. 724) [ORSTOM]; Taban (7° 59' N, 3° 04' W), 15-VI-1968, 1 M, 1 M gen (MEP Acc. 724, 92/189) [ORSTOM]. *Centre, Departement du*: M'Bahiakro, Dezidougou (7° 44' N, 4° 16' W), 22-V-1985, B. Bouchite, sweeping, 1 M, 1 M gen (SAMP Acc. 1138, IV 167, 92/401) [USNM]; same data except 24-V-1985, Huang & Pecor, plastic bottles placed on ORSTOM study tower, 4 m above ground (IV 148, IV 149), 17 M, 13 F, 30 individual rearings (18 l, 27 p), 2 L, 3 M gen, 1 F gen (SAMP Acc. 1138, IV 148, 85/211, 85/212, 93/46; IV 149, 92/610) [USNM]; same data except 16 m above ground (IV 137, IV 138, IV 139), 7 M, 7 F, 6 individual rearings (5 l, 6 p), 2 M gen, 1 F gen (SAMP Acc. 1138, IV 137, 93/44; IV 138, 92/608, 92/609) [USNM]; same data except 8 m above ground (IV 144), 1 M, 1 individual rearing (1 l, 1 p), 1 M gen (SAMP Acc. 1138, IV 144-14, 93/54) [USNM]; same data except 26-30-V-1985, Huang & Pecor, small tree holes (coffee tree), 0.33-3.0 m above ground (IV 194-IV 197, IV 200-IV 202, IV 232, IV 237, IV 241-IV 245, IV 247-IV 254, IV 256, IV 258, IV 259, IV 263-IV 265, IV 269, IV 271, IV 273, IV 276, IV 279, IV 281), partially shaded, in coffee plantation, 61 M, 52 F, 20 individual rearings (17 l, 20 p), 4 M gen (SAMP Acc. 1138, IV 196, 93/43; IV 248, 92/615; IV 249, 92/616; IV 258, 92/617) [USNM]; same data except 27-V-1985, Huang & Pecor, leaf axils (pineapple), partially shaded, 3 M, 3 F, 6 individual rearings (4 l, 6 p) (SAMP Acc. 1138, IV 206, IV 209) [USNM]; same data except 29-V-1985, Huang & Pecor, rot hole (coffee tree), partially shaded, in coffee plantation, 3 M (SAMP Acc. 1138, IV 255) [USNM]; same data except 30-V-1985, Huang & Pecor, stump hole, 0.33 m above ground, partially shaded, 5 M, 4 F (SAMP Acc. 1138, IV 270) [USNM]; same data except log hole on ground, partially shaded, 3 M, 2 F (SAMP Acc. 1138, IV 272) [USNM]; same data except large pot on ground, 1 M (SAMP Acc. 1138, IV 282) [USNM]; same data except 2-VI-1985, Huang & Pecor, stump hole, partially shaded, 5 M, 4 F (SAMP Acc. 1138, IV 299) [USNM]; same data except 2-4-VI-1985, Huang & Pecor, tree holes, 0.33-2.0 m above ground, 27 M, 30 F (SAMP Acc. 1138, IV 293, IV 304, IV 306, IV 307, IV 309, IV 311, IV 314, IV 315, IV 317-IV 320, IV 325, IV 328-IV 332) [USNM]; Kofidougou (7° 45' N, 4° 19' W), 26-V-1985, Huang & Pecor, plastic bottles placed on ORSTOM study tower, 12 m above ground (IV 158, IV 161), 8 M, 13 F, 21 individual rearings (10 l, 17 p), 8 L, 2 M gen (SAMP Acc. 1138, IV 161, 85/216, 85/217) [USNM]; same data except 28-V-1985, Huang & Pecor, leaf axil (lily), partially shaded, 1 M (SAMP Acc. 1138, IV 224) [USNM]; KM 2, 24-V-1985, Huang & Pecor, plastic bottle placed on ORSTOM study tower, 9 m above ground, 6 M, 4 F, 10 individual rearings (10 l, 10 p), 3 L, 3 M gen, 1 F gen (SAMP Acc. 1138, IV 157, 92/611, 92/612, 93/45, 92/614) [USNM]. Ivory Coast (Cote d' Ivoire), 8-III-1956, J.P. Adam, bamboo, 1 M (#002), 1 F (#004), 1 M gen (MEP Acc. 724, 92/601) [ORSTOM].

NIGERIA. *Western:* Ibadan (7° 23' N, 3° 50' E), VII-VIII-1929, H.W. Kumm, (B.M., 1929-591), 1 M (#30), 1 M gen (MEP Acc. 719, 92/186) [BMNH].

SIERRA LEONE. *Western Area*: Freetown (8° 30' N, 13° 10' W), IX-1914, Dr. G. Butler, (B.M., 1915-201), larva in tree hole at hill station, 1 F, 1 F gen (MEP Acc. 719, 92/224) [BMNH]. *Southern Province*: Tiwai Is. (7° 30' N, 11° 20' W), 7-V-1984, Y.M. Huang, (SAMP Acc. 1093), plastic bottles placed on trees, 0.5-2.0 m above ground, deeply shaded, in forest, 15 M, 28 F (#3, #4, #10, #17, #18, #25-#27), 43 individual rearings (24 l, 26 p), 4 M gen (SAMP Acc. 1093, #27, 85/230, 85/231; #18, 92/266, 92/267), 2 F gen (SAMP Acc. 1093, #25, 92/268; #26, 92/269) [USNM]; same data except 0.5-2.0 m above ground, partially shaded, in forest, 22 M, 24 F (#5-#7, #12, #28, #29, #32), 46 individual rearings (30 l, 44 p), 2 M gen (SAMP Acc. 1093, #29, 92/270; #32, 92/271), 2 F gen (SAMP Acc. 1093, #6, 92/275; #32, 92/341) [USNM]; same data except 3.5 m above ground, deeply shaded, in forest, 2 M (#1-21, 107), 2 individual rearings (1 l, 2 p), 1 L (#1), 1 M gen (SAMP Acc. 1093, 92/272) [USNM]; same data except 5.5

m above ground, partially shaded, in forest, 1 M (#13-100), 1 F (#13-12), 2 individual rearings (1 l, 2 p), 1 M gen (SAMP Acc. 1093, 92/273) [USNM]; same data except 15-V-1984, Y.M. Huang, tree hole, 2.33 m above ground, partially shaded, 1 F (#82-11), 1 individual rearing (1 l, 1 p), 1 F gen (SAMP Acc. 1093, 92/274) [USNM]; same data except 8-VI-1984, Y.M. Huang, bamboo stump, 1.33 m above ground, partially shaded, 3 M (#196-12, 13, 100), 3 individual rearings (2 l, 3 p), 2 M gen (SAMP Acc. 1093, 85/232, 85/233) [USNM]; Kasewe Forest Reserve (8° 19' N, 12° 13' W), 29-V-1984, Huang & Pecor, tree hole, 1.33 m above ground, partially shaded, 1 M, 1 F (#153-10, 11), 2 individual rearings (2 l, 2 p) [USNM].

DISTRIBUTION (Map 4). This species is known from Ghana, Ivory Coast, Nigeria and Sierra Leone.

In Sierra Leone, *Ae. mattinglyorum* occurs from Freetown in the west, through Kasewe Forest Reserve, to Tiwai Is. in the Southeast.

In the Ivory Coast, it occurs from Abidjan in the southeast, through Eremankono, Tiassale to Ville in the southwest, to Daine in the northwest, to Dezidougou and Kofidougou in the north, and to Goli, Taban, Tanda in the northeast.

In Ghana, it is found from Nsawam in the west, to Aburi in the northeast and to Accra in the southeast. It is also found in the southwestern part of Nigeria (Ibadan).

TAXONOMIC DISCUSSION. *Aedes mattinglyorum* differs from congeners of the *dendrophilus* group by: (1) scutum with anterior median white spot of broad scales; (2) hindfemur with a distinct white knee-spot; (3) hindtibia with a white longitudinal stripe on ventral surface in basal 0.31-0.42; (4) hindtarsomere 3 with basal 0.27-0.33 white on dorsal surface; (5) hindtarsomeres 4 and 5 with basal white band; and (6) hindtarsal claws equal and simple.

Adults of *Ae. mattinglyorum* closely resemble those of *Ae. dendrophilus* in the scutal markings but can be distinguished from the latter by the scutum with anterior median white spot of broad scales. This same character state of *Ae. mattinglyorum* is extremely similar to *Ae. keniensis*. However, *Ae. mattinglyorum* can be distinguished easily from *keniensis* by the hindtibia with a white longitudinal stripe on ventral surface in basal 0.31-0.42 and by the hindtarsomere 5 with the basal 0.60-0.82 white on the dorsal surface. In *keniensis*, the hindtibia has no white stripe on the ventral surface in the basal area and the hindtarsomere 5 is all dark.

The male genitalia of *Ae. mattinglyorum* are easily differentiated from all other species in the *dendrophilus* group by the claspette, which has the distal expanded portion oval in dorsal aspect (lateral and mesal sides more or less parallel), with numerous simple setae on the expanded distal portion and bearing 1 strong, basally widened, spine-like seta on the basomesal corner.

The larva of *Ae. mattinglyorum* is extremely similar to that of *Ae. dendrophilus* with similar comb scales and pecten spines, but can be distinguished from *dendrophilus* by the diagnostic character mentioned under the discussion of *dendrophilus*.

The pupa of *Ae. mattinglyorum* is extremely similar to that of *Ae. deboeri*, but can be distinguished from *deboeri* by the diagnostic characters given in the key.

Aedes mattinglyorum is apparently a West African forest species. Based on the present collection data, *Ae. mattinglyorum* occurs in habitats between <166 and 466 m in areas of yearly rainfall of 63.5-406.4 cm.

BIONOMICS. The immature stages of *Ae. mattinglyorum* have been collected from the following: tree holes in Ghana, the Ivory Coast and Sierra Leone; rot holes and leaf axils (banana, pineapple, lily) in Ghana and the Ivory Coast; stump holes and log hole in the Ivory Coast; bamboo pot and bamboo stump in the Ivory Coast and Sierra Leone; plastic bottles placed

on trees in forests, on Tiwai Island, Sierra Leone and in Abidjan, Ivory Coast, and on study towers in Dezidougou and Kofidougou, Ivory Coast.

In Ghana, larvae of *Ae. mattinglyorum* were collected from tree holes, rot hole in Cotton tree and from leaf axil (banana).

In the Ivory Coast, immature stages of *Ae. mattinglyorum* have been collected from plastic bottles that were placed on trees, 1.0-1.5 m above ground, partially shaded, in forest, in Abidjan and from tree hole in Daine; from small tree holes (coffee tree), 0.33-3.0 m above ground, partially shaded, in coffee plantation; from leaf axils (pineapple), rot hole (coffee tree), stump holes, 0.33 m above ground, log hole on ground and from a large pot on ground, partially shaded, in coffee plantation; from tree holes, 0.33-2.0 m above ground, partially shaded, in forest, in Dezidougou; from leaf axil (lily), partially shaded, in forest, in Kofidougou; and from plastic bottles that were placed on ORSTOM study towers, from 4-16 m above ground, partially shaded, in forests, in Dezidougou and Kofidougou, and from bamboo pot in Ivory Coast.

In Sierra Leone, the immature stages of *Ae. mattinglyorum* have been collected from tree holes, 1.33-2.33 m above ground, partially shaded, in forests, on Tiwai Is. and Kasewe Forest Reserve, and in Freetown; from plastic bottles that were placed on trees, 0.5-5.5 m above ground, partially shaded and 0.5-3.5 m above ground, deeply shaded, in the forest, and from bamboo stump, about 1.33 m above ground, partially shaded, in the forest, on Tiwai Is.

Preferred ovipositional sites for *Ae. mattinglyorum* based on the present study were tree holes, rot holes, plastic bottles that were placed on trees and on study towers in forests and leaf axils (banana, pineapple, lily), while stump holes, log hole, bamboo pot and bamboo stump were less commonly used.

The female of this species has been collected from a light trap in Ville, Ivory Coast.

Aedes mattinglyorum has been collected with *Ae. africanus* (Theobald) from Tiwai Island, Sierra Leone; it also occurs with *Ae. dendrophilus* from Nsawam, Ghana, and Dezidougou and Kofidougou, Ivory Coast.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) muroafcete New Species
(Figs. 5A, B)

FEMALE. *Head.* Proboscis slightly longer than forefemur; maxillary palpus 0.21 length of proboscis; pedicel covered with white scales except on dorsal surface; vertex with a median stripe of broad pale yellow scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 5A). Scutum with narrow dark scales, and a distinct median pale yellow spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow yellow scales, median yellow stripe connected with anterior median spot, reaching to prescutellar area; prescutellar line well developed, with narrow yellow scales, connecting with median longitudinal stripe at anterior margin of prescutellar area; fossal area with a large patch of broader crescent-shaped yellow scales, fossal yellow patch with anterior end extending along scutal margin towards the anterior median pale yellow spot; posterior dorsocentral yellow line of narrow scales present, reaching forward to the posterior end of fossal yellow patch; a patch of narrow pale yellow scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a patch of broad white scales and some dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for

a minute basal spot of white scales on costa; cell R_2 2.6 length of vein R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 5B). White knee-spot absent on fore- and hindfemora (represented by 2 pale scales on hindfemur), present on midfemur; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.4; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.53 that widens 0.4 from base; midtibia anteriorly dark, with a basal white spot on posterior surface; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.36; foretarsomere 1 with basal 0.13 white on dorsal surface; foretarsomere 2 with basal 0.38 white on dorsal surface; midtarsomere 1 with basal 0.15 white on dorsal surface; midtarsomere 2 with basal 0.84 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.21, 0.23 and 0.16; hindtarsomere 4 all white; hindtarsomere 5 all dark; fore-, mid- and hindlegs with tarsal claws equal, all toothed. *Abdomen.* Tergum I with white scales on laterotergite; tergum II with basolateral white spots; terga III-VII each with a basal pale yellow band and basolateral white spots which do not connect with the basal pale yellow band; sterna III-VII each with a basal pale band; segment VIII largely retracted.

MALE, PUPA and LARVA. Unknown.

TYPE DATA. Holotype female (MEP Acc. 725/ COLL. MUS. CONGO, *A.(S) bambusae*, 8. V. 52, J. Wolfs, Mt. KARISIMWA, KIVU), Kivu (3° 00' S, 28° 30' E), Mt. Karisimwa, *Kivu-Central,* ZAIRE, V-8-1952 (J. Wolfs). Deposited in Musee Royale de l'Afrique Centrale, Tervuren, Belgium [CMT].

DISTRIBUTION (Map 2). This species is presently known only from Zaire. *Aedes muroafcete* occurs in Mt. Karisimwa, Kivu.

ETYMOLOGY. This species is named (MUROAFCETE used as noun) for Musee Royale de l'Afrique Centrale at Tervuren, Belgium, in recognition and appreciation of the valuable contribution that the Department of Zoologie, Section d'Entomologie has made to our knowledge of the mosquito fauna of Africa.

TAXONOMIC DISCUSSION. *Aedes muroafcete* differs from congeners of the *dendrophilus* group by: (1) fossal yellow patch with anterior end extending along scutal margin towards the anterior median pale yellow spot; (2) posterior dorsocentral yellow line of narrow scales well developed, reaching forward to the posterior end of the fossal yellow patch; (3) white knee-spot absent on hindfemur, represented by 2 pale scales; (4) hindtibia with a white longitudinal stripe on ventral surface in basal 0.36; (5) hindtarsomere 3 with basal 0.16 white on dorsal surface; (6) hindtarsomere 4 all white; (7) hindtarsomere 5 all dark; and (8) female fore-, mid- and hindlegs with tarsal claws equal and toothed.

The adult female of *Ae. muroafcete* is extremely similar to that of *Ae. bambusae* with which it has been confused and misidentified. *Aedes muroafcete* can be distinguished from *bambusae*, however, by the hindtarsomere 5 all dark. In *bambusae*, the hindtarsomere 5 has basal 0.5-0.75 white on dorsal surface.

The adult female of *Ae. muroafcete* is also extremely similar to that of *Ae. kenyae.* However, *Ae. muroafcete* differs from *kenyae* by the absence of a distinct white knee-spot on the hindfemur and by hindtarsomere 5 all dark. In *kenyae*, the hindfemur has a well developed white knee-spot, and the hindtarsomere 5 has the basal 0.47-0.88 white on the dorsal surface.

Aedes muroafcete is most closely related and similar to *bambusae*, and I consider *muroafcete* to be the sister species of *bambusae.*

Aedes muroafcete is apparently an East African montane forest species that occurs at 2,166 m in areas of yearly rainfall of 152.4 cm.

BIONOMICS. Unknown.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) njombiensis New Species
(Figs. 11A, B)

FEMALE. *Head.* Proboscis longer than forefemur; maxillary palpus 0.18-0.2 length of proboscis; pedicel covered with white scales except on dorsal and ventral surfaces; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 11A). Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow pale yellow scales, median pale yellow stripe connected with anterior median white spot, reaching to prescutellar area; prescutellar line of narrow white scales not present, with only a few narrow pale scales; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral white line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.6-2.9 length of vein R_{2+3}. *Halter.* With dark and white scales. *Legs* (Fig. 11B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.33-0.42; midfemur anteriorly without a large, median white spot; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.59-0.64 that widens 0.28-0.3 from base; mid- and hindtibiae all dark; foretarsomere 1 with basal 0.2-0.22 white on dorsal surface; foretarsomere 2 with basal 0.33-0.37 white on dorsal surface; midtarsomere 1 with basal 0.25-0.28 white on dorsal surface; midtarsomere 2 with basal 0.33-0.38 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.26-0.28, 0.23-0.26, and 0.11-0.18; hindtarsomere 4 all white; hindtarsomere 5 all dark; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple. *Abdomen.* Tergum I with white scales on laterotergite and with a median white patch; terga II-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sterna III-VII each with a basal white band; segment VIII completely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 5 larger setae on apical 0.5; tergum IX as long as broad, apical margin of tergum IX with well developed lateral lobes, each with 4-5 setae; apical margin of postgenital plate without a median notch.

MALE, PUPA and LARVA. Unknown.

TYPE DATA. Holotype female (MEP Acc. 719/ outside house, Njombe, 6,000-6,500 ft, Tanganyika, 7-1-1952, Dr. W. Peters), Njombe (9° 20' S, 34° 46' E), *Iringa Region*, TANZANIA, 7-I-1952 (Dr. W. Peters). Deposited in BMNH. 1 Paratype female (MEP Acc. 719), same data as holotype except 8-III-1952, Dr. W. Peters, No. AE/1/1. Deposited in the BMNH.

OTHER MATERIAL EXAMINED. KENYA. *Nairobi area:* Nairobi (1° 17' S, 36° 50' E), 1 F (MEP Acc. 726/ LF. 96, identified as *keniensis*), 1 F gen (MEP Acc. 726, 95/205) [LSHTM].

REMARKS. Two specimens identified as *keniensis*, in London School of Hygiene and Tropical Medicine [LSHTM], are probably from Nairobi, Kenya. These two specimens: 1 male (LF. 18) is *keniensis*, and 1 female (LF. 96) which has the scutum with anterior median white spot of narrow scales, is not *keniensis,* but is the new species, *njombiensis.*

DISTRIBUTION (Map 1). This species is known from Kenya and Tanzania. *Aedes njombiensis* occurs in the southwestern part of Tanzania (Njombe). In Kenya, it is found in Nairobi area probably Langata Forest.

TAXONOMIC DISCUSSION. *Aedes njombiensis* differs from congeners of the *dendrophilus* group by: (1) scutum with anterior median white spot of narrow scales; (2) hindfemur with a distinct white knee-spot; (3) hindtibia without a white longitudinal stripe on ventral surface in basal area; (4) hindtarsomere 3 with basal 0.11-0.18 white on dorsal surface; (5) hindtarsomere 4 all white; and (6) hindtarsomere 5 all dark.

The adult female of *Ae. njombiensis* is extremely similar to that of *Ae. keniensis* with which it has been confused and misidentified. *Aedes njombiensis* can be distinguished from *keniensis*, however, by the scutum with anterior median white spot of narrow scales. In *keniensis*, the scutum has anterior median white spot of broad scales.

The adult female of *Ae. njombiensis* is also extremely similar to that of *Ae. masseyi.* However, *Ae. njombiensis* differs from *masseyi* by the hindtarsomere 3 with basal 0.11-0.18 white on dorsal surface. In *masseyi*, the hindtarsomere 3 is all dark.

Aedes njombiensis is most closely related and similar to *Ae. keniensis*, and I consider *Ae. njombiensis* to be a sister species of *Ae. keniensis.*

Aedes njombiensis is apparently an East African Highland species that occurs in habitats between 1,833 and 2,166.6 m in areas of yearly rainfall of 88.9-101.6 cm.

BIONOMICS. The holotype female was taken outside a house at Njombe, Tanzania. *Aedes njombiensis* has been found in association with *Ae. keniensis* from Nairobi, Kenya.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) segermanae New Species
(Figs. 14A, B, C, D; 17B)

Aedes (Stegomyia) demeilloni Edwards, Muspratt 1956: 56 (M*, F*, L*) (in part).

FEMALE. *Head.* Proboscis longer than forefemur; maxillary palpus 0.18-0.24 length of proboscis; pedicel covered with white scales except on dorsal surface, or sometimes except on dorsal and ventral surfaces; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax.* Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow pale yellow scales, median yellow stripe usually indistinct or incomplete in anterior 0.33-0.50 of scutum, reaching to prescutellar area; prescutellar line of narrow white scales usually not present, with only a few narrow white scales on posterior 0.5 of prescutellar area; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral pale yellow line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a patch of broad white scales and a few dark narrow scales dorsally; upper mesepimeral scale patch connected with lower mesepimeral scale patch. *Wing.* With dark scales on all veins except for

a minute basal spot of white scales on costa; cell R_2 2.1-2.3 length of vein R_{2+3}. *Halter.* With dark and white scales. *Legs* (Fig. 14B). White knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow white longitudinal stripe on ventral surface in basal 0.26-0.36; midfemur anteriorly without a large, median white spot, sometimes with a few pale scales scattered in basal 0.6; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.54-0.6 that widens 0.21-0.28 from base; midtibia anteriorly dark; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.13-0.25; foretarsomere 1 with basal 0.1-0.18 white on dorsal surface; foretarsomere 2 with basal 0.21-0.4 white on dorsal surface; midtarsomere 1 with basal 0.14-0.28 white on dorsal surface; midtarsomere 2 with basal 0.33-0.62 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.32, 0.22-0.3, and 0.2-0.33; hindtarsomere 4 all white, sometimes with a few dark scales at apex on ventral surface; hindtarsomere 5 all white except tip; fore-, Mid- and hindlegs with tarsal claws equal, all simple (Fig. 14A). *Abdomen.* Tergum I with white scales on laterotergite; sometimes tergum I with a median white spot; terga II-VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sometimes tergum II with basolateral white spots only; sterna III-VII each with a basal white band; segment VIII completely retracted. *Genitalia.* Insula longer than wide, with minute setae and with 3-4 larger setae on apical 0.33; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 2-3 setae; apical margin of postgenital plate without a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus as long as to slightly shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Thorax.* Prescutellar line of narrow white scales usually present. *Wing.* Cell R_2 1.3-1.9 length of vein R_{2+3}. *Legs* (Fig. 14C). Midtarsomere 2 with basal 0.3-0.6 white on dorsal surface; fore- and midlegs with tarsal claws unequal, all simple (Fig. 14D). *Abdomen.* Tergum II usually with basolateral white spots only. *Genitalia* (Fig. 17B). Gonocoxite 2.3 times as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (lateral side rather straight, with mesal side rounded), with numerous simple setae on the expanded distal portion and bearing 2-3 stout, basally widened spine-like setae on mesal side; gonostylus simple, elongate, about 0.59 length of gonocoxite, with a short stout gonostylar claw at apex and with a few setae in apical 0.25; aedeagus strongly toothed, with 2-3 lateral teeth longer than the others; paraproct with a short sternal arm; apical margin of tergum IX deeply concave medially with 8-9 setae on lateral lobe.

PUPA and LARVA. Unknown.

TYPE DATA. Holotype female (MEP Acc. 719/ Port St. Johns, Pondoland, S. Africa, Coll. J. Muspratt, 1951/ SAIMR, CSIR/YF/51, Coll. No. P216/ *Aedes (s.) demeilloni* Edw. Det. J.M. 1951), with fore- and midtarsal claws on slide, Port St. Johns (31° 38' S, 29° 33' E), *Cape Province*, SOUTH AFRICA. Deposited in the BMNH. Allotype male (MEP Acc. 802/ Port St. Johns, Transkei, C.P., Coll. J. Muspratt/ SAIMR, CSIR-52, Coll. No. P399E/ *Aedes (Steg.) demeilloni* Edw. Det. J.M. 1952), with genitalia on slide (MEP Acc. 802, 90/70), with tarsal claws on slide, same data as holotype. Deposited in the Department of Medical Entomology, the South African Institute for Medical Research, Johannesburg [SAIM]. Paratypes: 1 male (MEP Acc. 802/ Port St. Johns, Transkei, C.P., Coll. J. Muspratt/ SAIMR, CSIR-51, Coll. No. P209/ *Aedes (Steg.) demeilloni* Edw. Det. J.M. 1951), with genitalia on slide (MEP Acc. 802, 90/69), with tarsal claws on slide, same data as holotype [SAIM]; 1 female (MEP Acc.802/ Mazeppa Bay, Transkei, C.P., Coll. J. Muspratt/ SAIMR, CSIR-51, Coll. No. M232/ *Aedes (Steg.)*

demeilloni Edw. Det. J.M. 1951), with genitalia on slide (MEP Acc. 802, 95/212), with tarsal claws on slide, same data as holotype except Mazeppa Bay (32° 30' S, 28° 35' E) [SAIM].

OTHER MATERIAL EXAMINED. SOUTH AFRICA. *Natal:* Amanzimtoti (30° 03' S, 30° 53' E), 1950, J. Muspratt, 1 M (MEP Acc. 719/ SAIMR, CSIR/YF/50, Coll. No. S.C.4/1), 1 M gen (MEP Acc. 719, 79/202), with fore- and midtarsal claws on slide [BMNH]; Margate (30° 51' S, 30° 22' E), 1950, J. Muspratt, 2 M (MEP Acc. 802/ SAIMR, Coll. No. A4/50, E4/56, E4/55), 1 F (MEP Acc. 802/ SAIMR, Coll. No. A4/50), with tarsal claws on slide, 2 M gen (MEP Acc. 802, 90/67, 90/68) [SAIM]; St Winifreds (30° 06' S, 30° 51' E), 1950, J. Muspratt, 1 M (MEP Acc. 802/ SAIMR, CSIR-50, Coll. No. S.C.12), 1 M gen (MEP Acc. 802, 90/71), with tarsal claws on slide [SAIM]; Melville (30° 39' S, 30° 31' E), I-1968, B.M. McIntosh, No. 6862, leave axils of *Dracaena hookeriana,* 1 F (MEP Acc. 801, M563/J), with tarsal claws on slide [NIV]; same data, 3 M (MEP Acc. 801/ M1349-6), 3 M gen (MEP Acc. 801, 95/208, 95/209, 95/210), with tarsal claws on slides [NIV]; same data , 1 M, 2 F (MEP Acc. 801/ M1349-7), 1 M gen, 1 F gen (MEP Acc. 801, 90/75, 95/211) [NIV].

DISTRIBUTION (Map 5). This species is known only from South Africa. Based on the present collection data, *Aedes segermanae* occurs mainly along the coast of South Africa. It is found from Amanzimtoti, Natal in the northeast, through St. Winifreds, Melville, Margate to Port St. Johns and Mazeppa Bay, Cape Province in the southwest.

ETYMOLOGY. This species is named to honor Mrs. Joyce Segerman, formerly Secretary of the Department of Medical Entomology, the South African Institute for Medical Research, Johannesburg, South Africa, in recognition and appreciation of her contributions to our knowledge of the mosquito fauna of South Africa.

TAXONOMIC DISCUSSION. *Aedes segermanae* differs from congeners of the *dendrophilus* group by: (1) scutum with anterior median white spot of narrow scales; (2) hindfemur with a distinct white knee-spot; (3) hindtibia with a white longitudinal stripe on ventral surface in basal 0.13-0.25; (4) hindtarsomere 3 with basal 0.2-0.33 white on dorsal surface; (5) hindtarsomeres 4 all white on dorsal surface; (6) hindtarsomere 5 all white except tip; (7) female fore- and midlegs with tarsal claws equal and simple; (8) male fore- and midlegs with tarsal claws unequal, all simple; and (9) female and male hindleg with tarsal claws equal and simple.

The adult male and female of *Ae. segermanae* are extremely similar to those of *Ae. demeilloni* with which it has been confused and misidentified. *Aedes segermanae* can be distinguished from *demeilloni*, however, by the fore- and midlegs with tarsal claws all simple. In *demeilloni*, the female fore- and midtarsal claws which are equal and toothed; on the male, the fore- and midtarsal claws which are unequal, the smaller one toothed, the larger one simple.

The adult male and female of *Ae. segermanae* are also extremely similar to those of *Ae. heischi.* However, *Ae. segermanae* can be distinguished easily from *heischi* by the midtarsomeres 1 and 2 without a well marked white stripe on posterior surface, and by the fore- and midtarsal claws all simple. In *heischi,* the midtarsomeres 1 and 2 which has a well-marked white stripe on posterior surface; and the female fore- and midtarsal claws which are equal and toothed; on the male, the fore- and midtarsal claws which are unequal, the smaller one toothed, the larger one simple.

The male genitalia of *Ae. segermanae* are very similar to those of *Ae. demeilloni* and *Ae. heischi* in having the claspette with distal expanded portion oval in dorsal aspect, but can be separated from those of *demeilloni* and *heischi* by the claspette, which has the lateral side rather straight, with mesal side rounded, with numerous simple setae on the expanded distal portion and bearing 2-3 stout, basally widened spine-like setae on the mesal side.

Aedes segermanae is apparently a lowland coastal scrub forest species that occurs in habitats between 3.33 and 166 m in areas of yearly rainfall of 101.6-127 cm.

BIONOMICS. The immature stages of *Ae. segermanae* have been collected from leaf axils of *Dracaena hookeriana* in coastal scrub forest and coastal forest, in Natal and Cape provinces, South Africa.

Aedes segermanae has been found in association with *Ae. demeilloni* from leaf axils of *Dracaena hookeriana* in Melville, Natal.

Aedes segermanae appears to be almost entirely associated with the plant *Dracaena hookeriana* Koch.

Muspratt (1956: 58) stated that *Dracaena hookeriana* grows mostly in the shade of the coastal scrub forest of Natal and the eastern Cape Province (Transkei).

Muspratt (1956: 58) reported that the females of *demeilloni* attack man during the daytime. Adult catches made in the neighborhood of Port St. Johns (Transkei) in the late afternoon showed that they appeared at the rate of 60-100 per hour, in calm weather. There were two persons acting as bait and remaining in one place for two or more hours at a time. When there was light but cool wind, catches were very much less. We now know that Muspratt's *demeilloni* included two distinct species. However, the specimens from Port St. Johns (Transkei) that Muspratt (1956: 58) regarded as *demeilloni* are not really *demeilloni*, but are the new species *segermanae*.

MEDICAL IMPORTANCE. Unknown. Muspratt (1956: 58) reported: "In 1952 eggs of *demeilloni* were sent to the Virus Research Institute at Entebbe (Uganda), so that colonies of adults could be reared for yellow fever transmission experiments. These showed that the females can harbour the virus for some time, but transmission by bite was negative. Their inability to transmit yellow fever in the laboratory or in nature is, however, uncertain."

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APPENDIX I. PRESENT STATUS OF SPECIES OF THE *AEDES (STEGOMYIA) DENDROPHILUS* GROUP

SPECIES	STAGES					BIONOMICS
	A		P	L	E	
	M	F				
amaltheus	X*	X*	X*	X*	-	Immature habitats known, female bites man
bambusae	X*	X*	X	X	-	Immature habitats known, female bites man
deboeri	X*	X*	X*	X*	-	Immature habitats known, female bites man
demeilloni	X*	X*	X*	X*	-	Immature habitats known, female bites man
dendrophilus	X*	X*	X*	X*	-	Immature habitats known, female bites man
hansfordi	X*	X*	X*	X*	-	Immature habitats known, female bites man
heischi	X*	X*	X*	X*	-	Immature habitats known, female unknown
keniensis	X*	X*	-	X*	-	Immature habitats known, female bites man
kenyae	X*	X*	-	X	-	Immature habitats known, female bites man
masseyi	X*	X*	-	?X	-	Immature habitats known, female bites man
mattinglyorum	X*	X*	X*	X*	-	Immature habitats known, female bites man
muroafcete	-	X*	-	-	-	Immature habitats unknown, female unknown
njombiensis	-	X*	-	-	-	Immature habitats unknown, female unknown
segermanae	X*	X*	-	-	-	Immature habitats known, female bites man

X* = Stage or sex described and illustrated.
- = Stage or sex unknown.
X = Stage or sex described.
? = Stage is not known with certainty.

LIST OF COUNTRY ABBREVIATIONS

ANG	=	ANGOLA
BOT	=	BOTSWANA (Bechuanaland)
BUR	=	BURKINA FASO (Upper Volta, Haute-Volta)
CAM	=	CAMEROON (Cameroun)
CEN	=	CENTRAL AFRICAN REPUBLIC
EQU	=	EQUATORIAL GUINEA (Fernando Po)
GHA	=	GHANA(Gold Coast)
IVO	=	IVORY COAST (Cote d'Ivoire)
KEN	=	KENYA
MOZ	=	MOZAMBIQUE
NIG	=	NIGERIA
SEN	=	SENEGAL
SIE	=	SIERRA LEONE
SOU	=	SOUTH AFRICA
TAN	=	TANZANIA (Tanganyika)
UGA	=	UGANDA
ZAI	=	ZAIRE (Belgian Congo)
ZAM	=	ZAMBIA (N. Rhodesia)
ZIM	=	ZIMBABWE(S. Rhodesia)

APPENDIX II. DISTRIBUTION LIST OF SPECIES OF THE *AEDES (STEGOMYIA) DENDROPHILUS* GROUP

	AFROTROPICAL REGION						
SPECIES	ANG	BOT	BUR	CAM	CEN	EQU	GHA
amaltheus		*					
bambusae							
deboeri							
demeilloni							
dendrophilus	?					*	X
hansfordi			X	X	X		
heischi							
keniensis							
kenyae							
masseyi							
mattinglyorum							X
muroafcete							
njombiensis							
segermanae							

SPECIES	IVO	KEN	MOZ	NIG	SEN	SIE	SOU
amaltheus							
bambusae							
deboeri		X					
demeilloni							X
dendrophilus	X						
hansfordi	X				X		X
heischi		X	*				X
keniensis		X					
kenyae		X					
masseyi							
mattinglyorum	X			X		X	
muroafcete							
njombiensis		X					
segermanae							X

APPENDIX II. (Continued).

	AFROTROPICAL REGION				
SPECIES	TAN	UGA	ZAI	ZAM	ZIM
amaltheus				X	X
bambusae		X	X		
deboeri					
demeilloni					
dendrophilus			?		
hansfordi	X	X			
heischi	X				
keniensis					
kenyae					
masseyi	X		X	X	
mattinglyorum					
muroafcete			X		
njombiensis	X				
segermanae					

X = Areas from which specimens were examined.
* = Record from literature.
? = Doubtful Record.

LIST OF MAPS

1. Distribution of *Aedes (Stg.) amaltheus*, *Aedes (Stg.) keniensis, Aedes (Stg.) masseyi* and *Aedes (Stg.) njombiensis.*

2. Distribution of *Aedes (Stg.) bambusae, Aedes (Stg.) deboeri, Aedes (Stg.) demeilloni, Aedes (Stg.) kenyae* and *Aedes (Stg.) muroafcete,*.

3. Distribution of *Aedes (Stg.) dendrophilus* and *Aedes (Stg.) hansfordi.*

4. Distribution of *Aedes (Stg.) mattinglyorum.*

5. Distribution of *Aedes (Stg.) heischi* and *Aedes (Stg.) segermanae.*

LIST OF FIGURES

1. *Aedes (Stg.) amaltheus* - A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

2. *Aedes (Stg.) bambusae* - A, thorax (dorsal view);
Aedes (Stg.) deboeri - B, thorax (dorsal view); C, female tarsal claws (fore-, mid- and hindlegs); D, male tarsal claws (fore-, mid- and hindlegs).

3. *Aedes (Stg.) bambusae* - A, female fore-, mid- and hindlegs (anterior view); B, male fore-, mid- and hindlegs (anterior view);
Aedes (Stg.) kenyae - C, male fore- mid- and hindlegs (anterior view).

4. *Aedes (Stg.) kenyae* - A, female fore-, mid- and hindlegs (anterior view);
Aedes (Stg.) deboeri - B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view).

5. *Aedes (Stg.) muroafcete* - A, thorax (Holotype) (dorsal view); B, female (Holotype) fore-, mid- and hindlegs (anterior view);
Aedes (Stg.) dendrophilus - C, male thorax (dorsal view).

6. *Aedes (Stg.) demeilloni* - A, female tarsal claws (fore-, mid- and hindlegs); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

7. *Aedes (Stg.) dendrophilus* - A, female thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, female tarsal claws (fore- and hindlegs); E, male tarsal claws (fore- and hindlegs).

8. *Aedes (Stg.) hansfordi* - A, female tarsal claws (fore-, mid- and hindlegs); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

9. *Aedes (Stg.) heischi* - A, female tarsal claws (fore-, mid- and hindlegs); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

10. *Aedes (Stg.) keniensis*- A, male tarsal claws (fore- and midlegs); B, male fore-, mid- and hindlegs (anterior view); C, female fore-, mid- and hindlegs (anterior view); D, female tarsal claws (fore- and midlegs).

11. *Aedes (Stg.) njombiensis* - A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view);
Aedes (Stg.) keniensis - C, thorax (dorsal view).

12. *Aedes (Stg.) masseyi*- A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, female tarsal claws (fore- and hindlegs); E, male tarsal claws (mid- and hindlegs).

13. *Aedes (Stg.) mattinglyorum* - A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, female tarsal claws (fore- and hindlegs); E, male tarsal claws (fore- and hindlegs).

14. *Aedes (Stg.) segermanae* - A, female tarsal claws (fore-, mid- and hindlegs); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

15. *Aedes (Stg.) amaltheus* - A, male genitalia;
Aedes (Stg.) bambusae - B, male genitalia.

16. *Aedes (Stg.) deboeri* - A, male genitalia;
Aedes (Stg.) kenyae - B, male genitalia.

17. *Aedes (Stg.) demeilloni* - A, male genitalia;
Aedes (Stg.) segermanae - B, male genitalia.

18. *Aedes (Stg.) dendrophilus* - A, male genitalia;
Aedes (Stg.) hansfordi - B, male genitalia.

19. *Aedes (Stg.) heischi* - A, male genitalia; B, larva.

20. *Aedes (Stg.) keniensis* - A, male genitalia;
Aedes (Stg.) masseyi - B, male genitalia.

21. *Aedes (Stg.) mattinglyorum* - A, B, pupa; C, male genitalia.

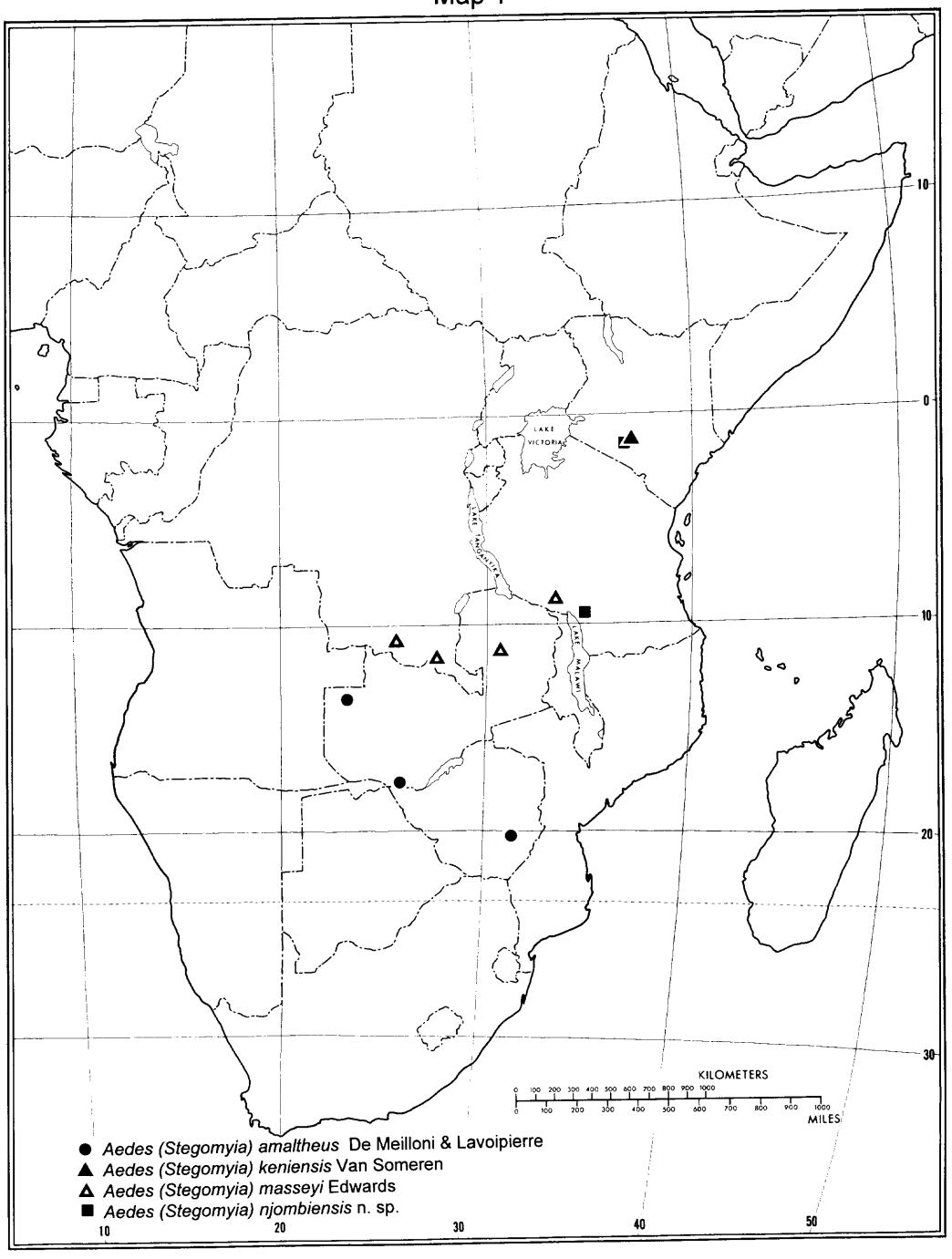
22. *Aedes (Stg.) mattinglyorum* - A, B, C, larva.

23. *Aedes (Stg.) deboeri* - A, larva;
Aedes (Stg.) demeilloni - B, larva.

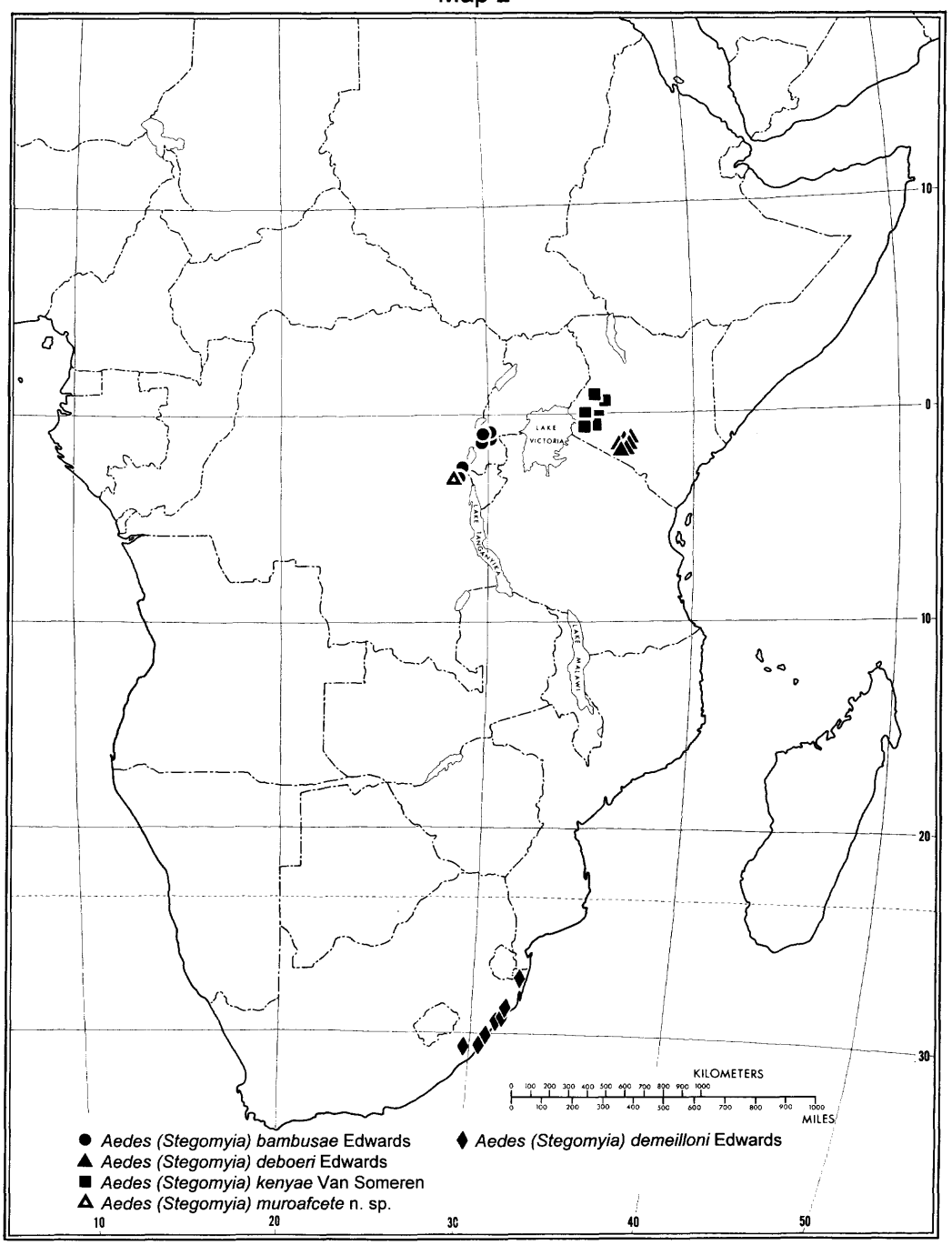
24. *Aedes (Stg.) dendrophilus* - A, larva;
Aedes (Stg.) hansfordi - B, larva.

25. *Aedes (Stg.) deboeri* - A, pupa;
Aedes (Stg.) demeilloni - B, pupa;
Aedes (Stg.) dendrophilus - C, pupa;
Aedes (Stg.) hansfordi - D, pupa;
Aedes (Stg.) heischi - E, pupa; F, basal spine of meso- and metapleural setal groups.

Map 1


LAKE VICTORIA
LAKE TANGANYIKA
LAKE MALAWI
10
0
10
20
30
KILOMETERS
0 100 200 300 400 500 600 700 800 900 1000
0 100 200 300 400 500 600 700 800 900 1000
MILES
● Aedes (Stegomyia) amaltheus De Meilloni & Lavoipierre
▲ Aedes (Stegomyia) keniensis Van Someren
△ Aedes (Stegomyia) masseyi Edwards
■ Aedes (Stegomyia) njombiensis n. sp.
10
20
30
40
50

Map 2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LAKE TANGANYIKA
LAKE MALAWI
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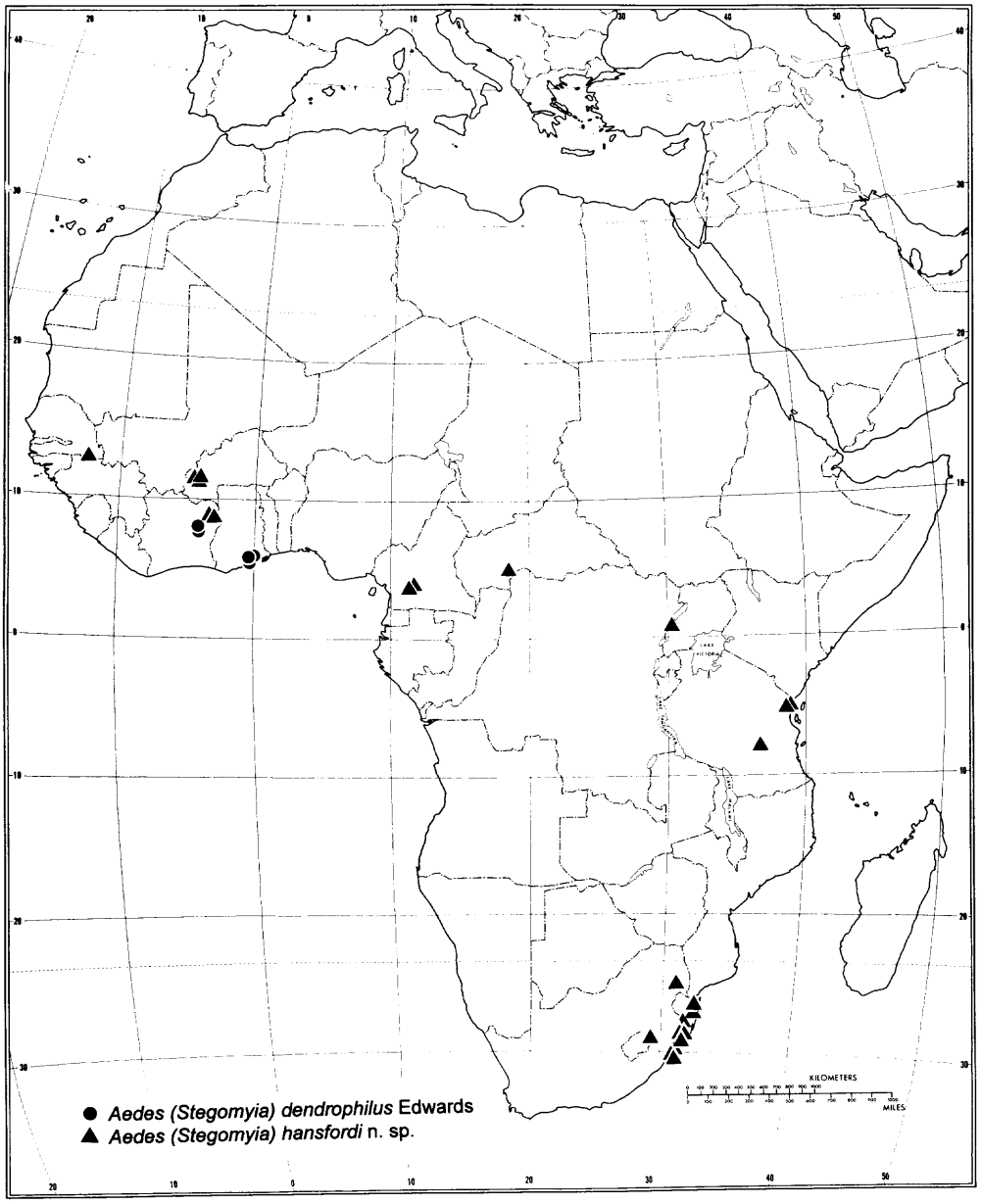
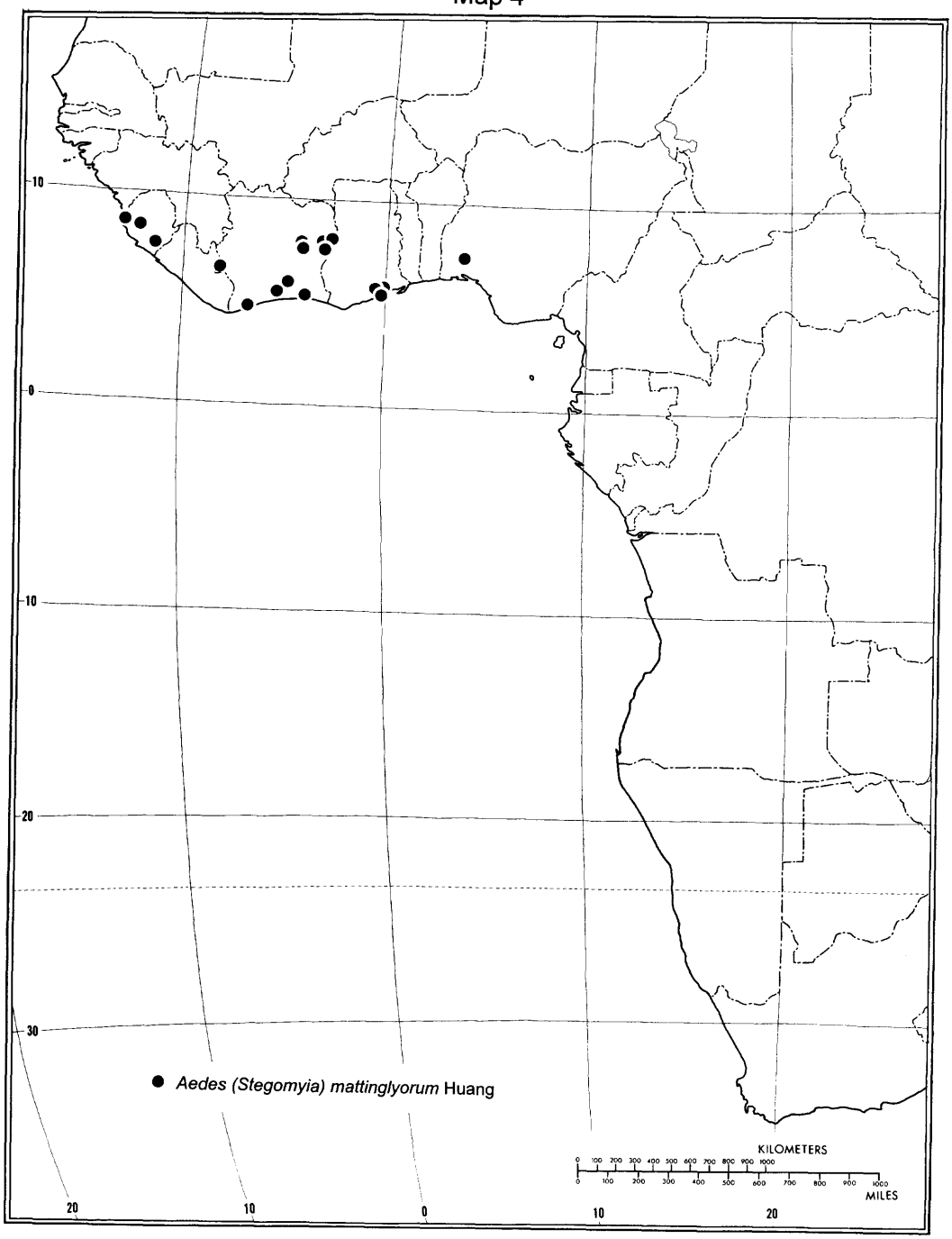
0 100 200 300 400 500 600 700 800 900 1000
MILES
● Aedes (Stegomyia) bambusae Edwards
▲ Aedes (Stegomyia) deboeri Edwards
■ Aedes (Stegomyia) kenyae Van Someren
△ Aedes (Stegomyia) muroafcete n. sp.
♦ Aedes (Stegomyia) demeilloni Edwards
10
20
30
40
50

Map 3


● *Aedes (Stegomyia) dendrophilus* Edwards
▲ *Aedes (Stegomyia) hansfordi* n. sp.
KILOMETERS
MILES

Map 4


10
0
10
20
30
20
10
0
10
20
● Aedes (Stegomyia) mattinglyorum Huang
KILOMETERS
0 100 200 300 400 500 600 700 800 900 1000
0 100 200 300 400 500 600 700 800 900 1000
MILES

Map 5

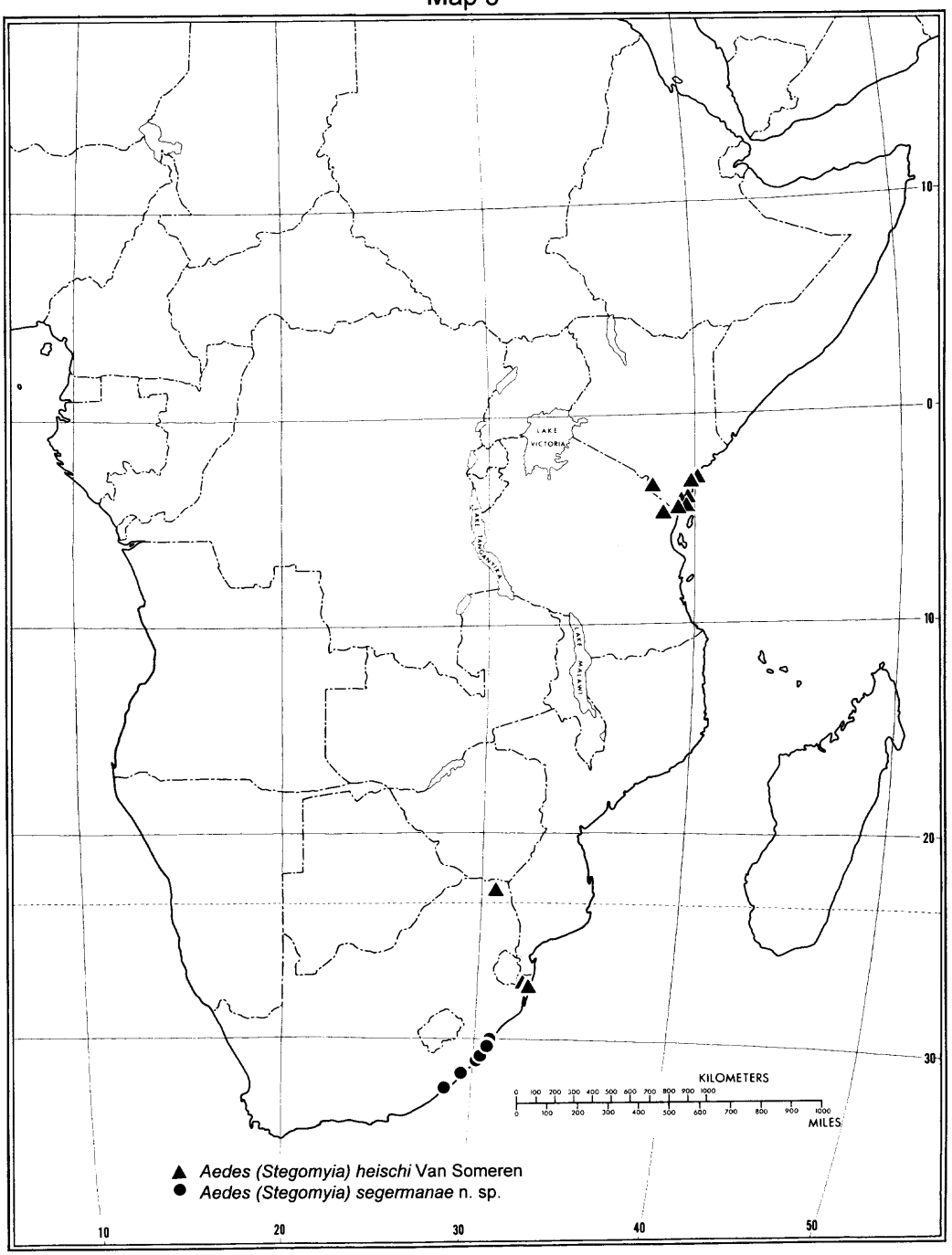
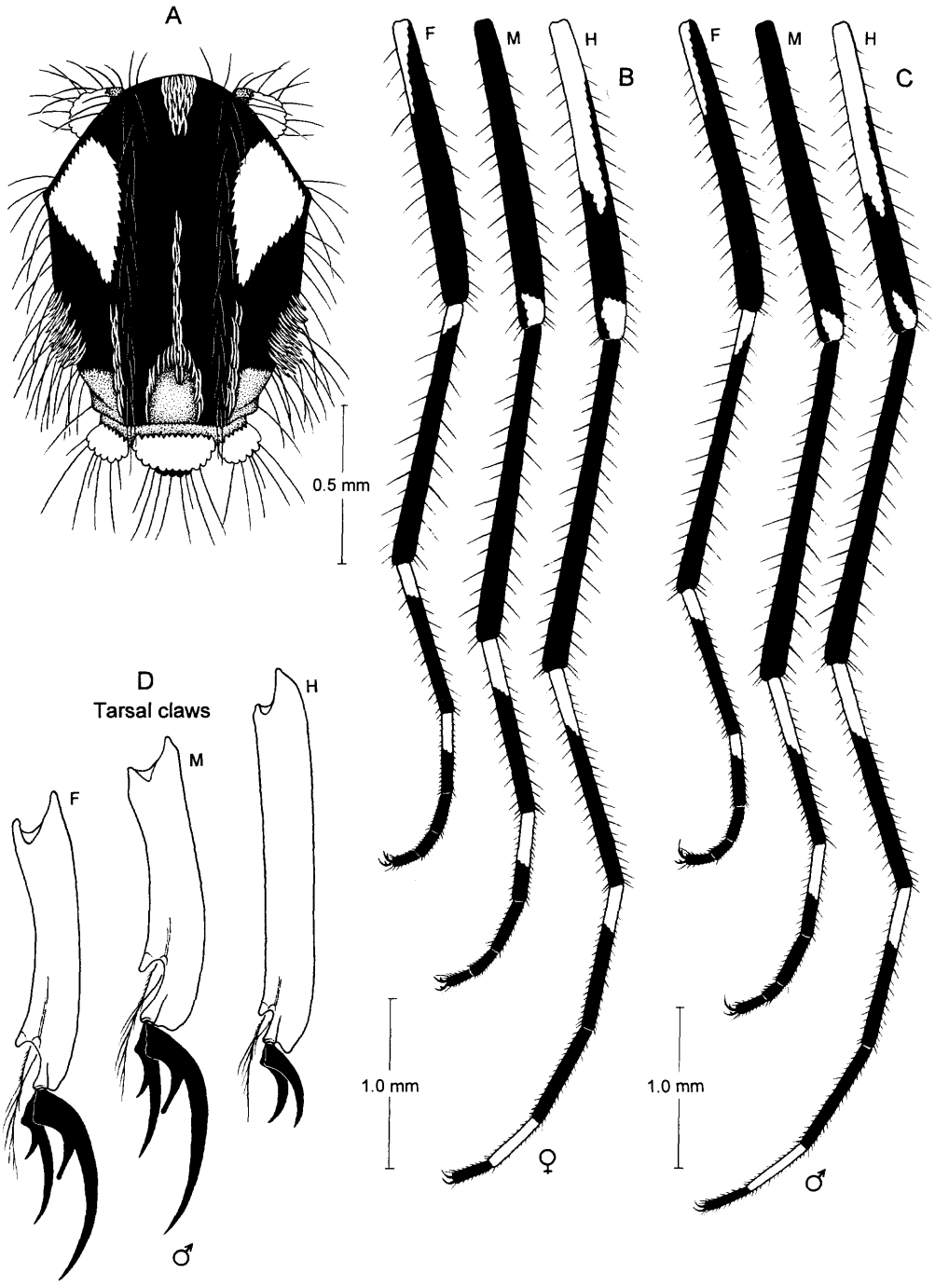

LAKE VICTORIA
LAKE TANGANYIKA
LAKE MALAWI
KILOMETERS
0 100 200 300 400 500 600 700 800 900 1000
0 100 200 300 400 500 600 700 800 900 1000
MILES
▲ *Aedes (Stegomyia) heischi* Van Someren
● *Aedes (Stegomyia) segermanae* n. sp.
10
0
10
20
30
10
20
30
40
50

Fig. 1



Aedes (Stegomyia) amaltheus

Fig. 2

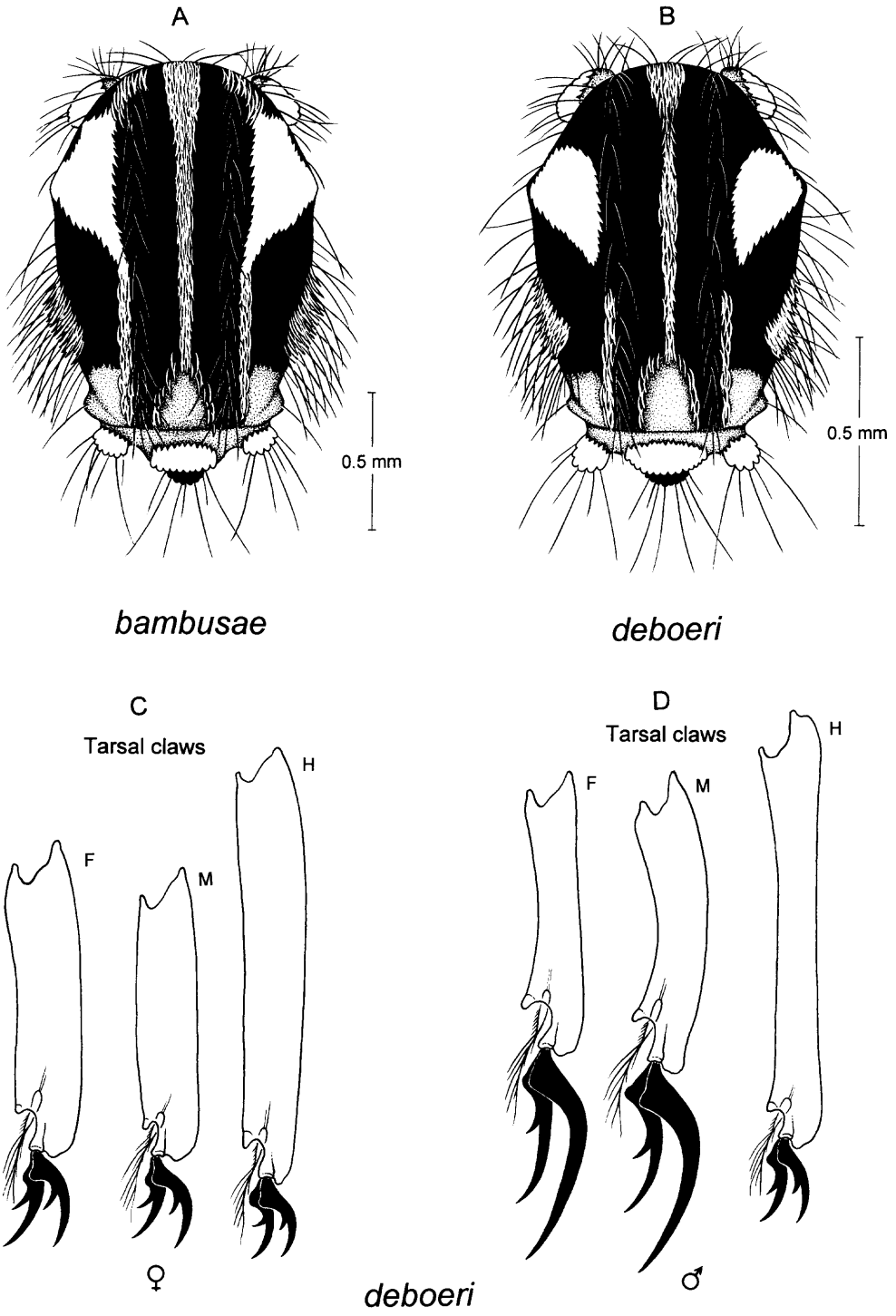

A
B
0.5 mm
0.5 mm
bambusae
deboeri
C
Tarsal claws
F
M
H
♀
D
Tarsal claws
F
M
H
♂
deboeri

Fig. 3

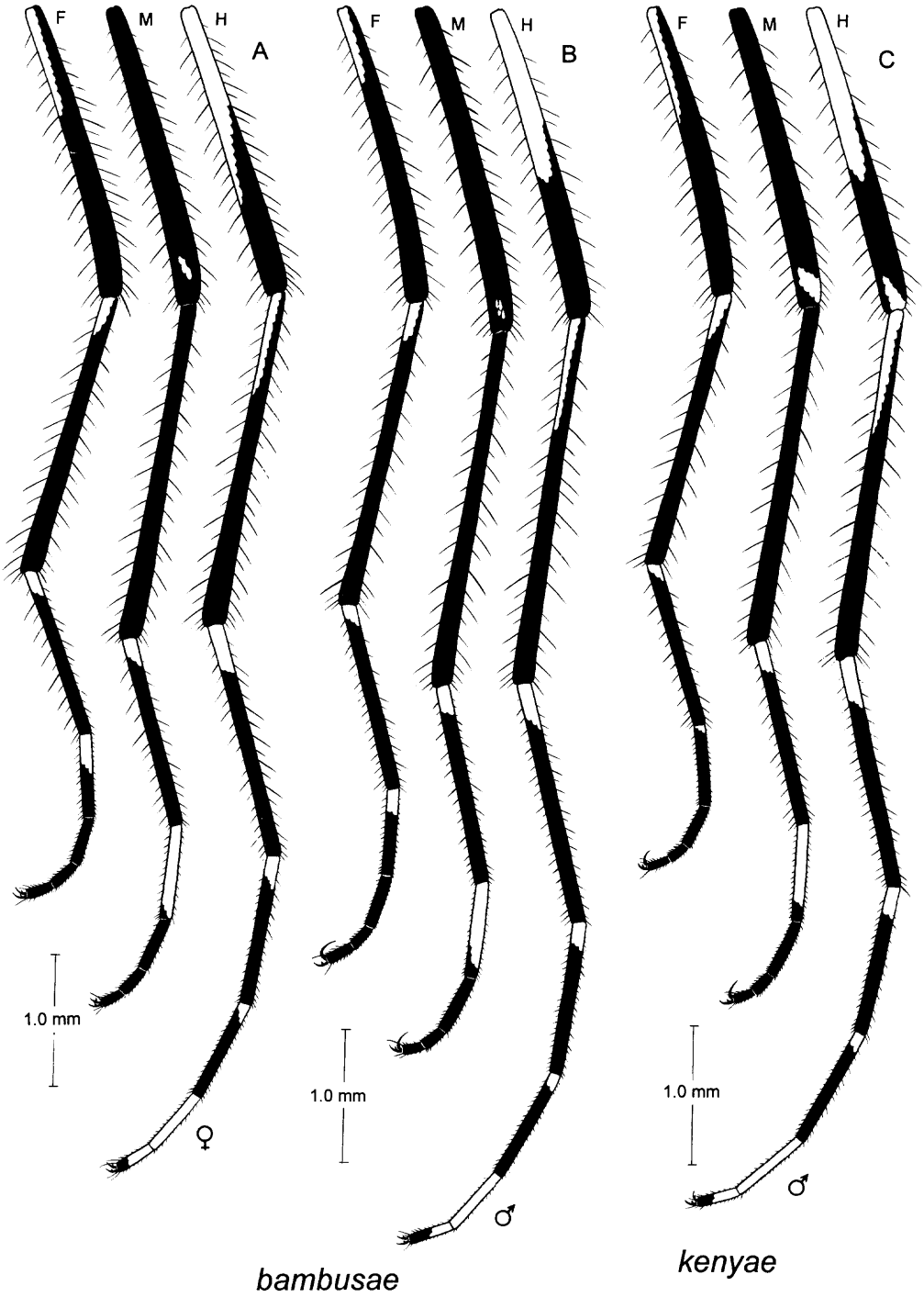


Fig. 4

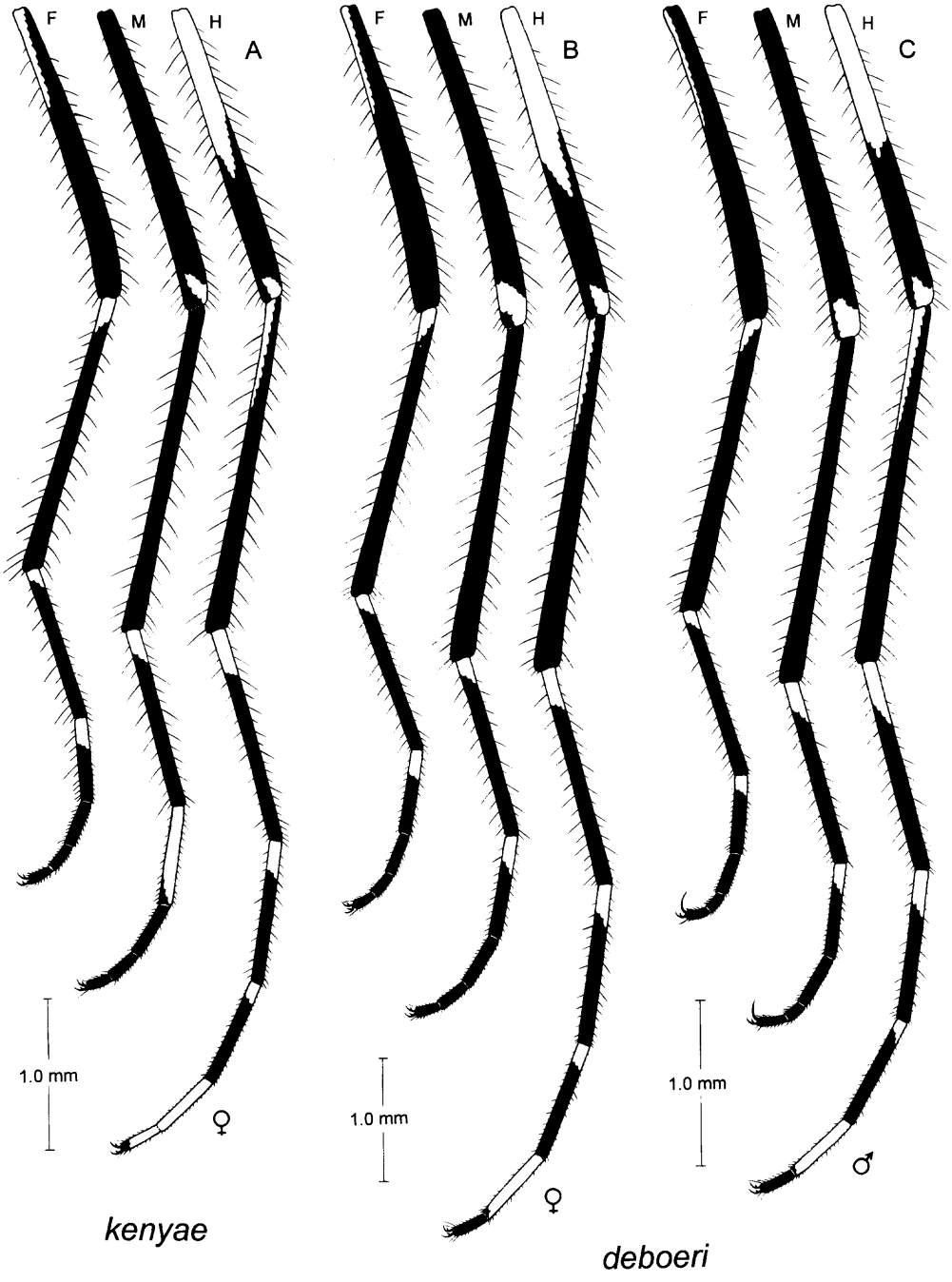


Fig. 5

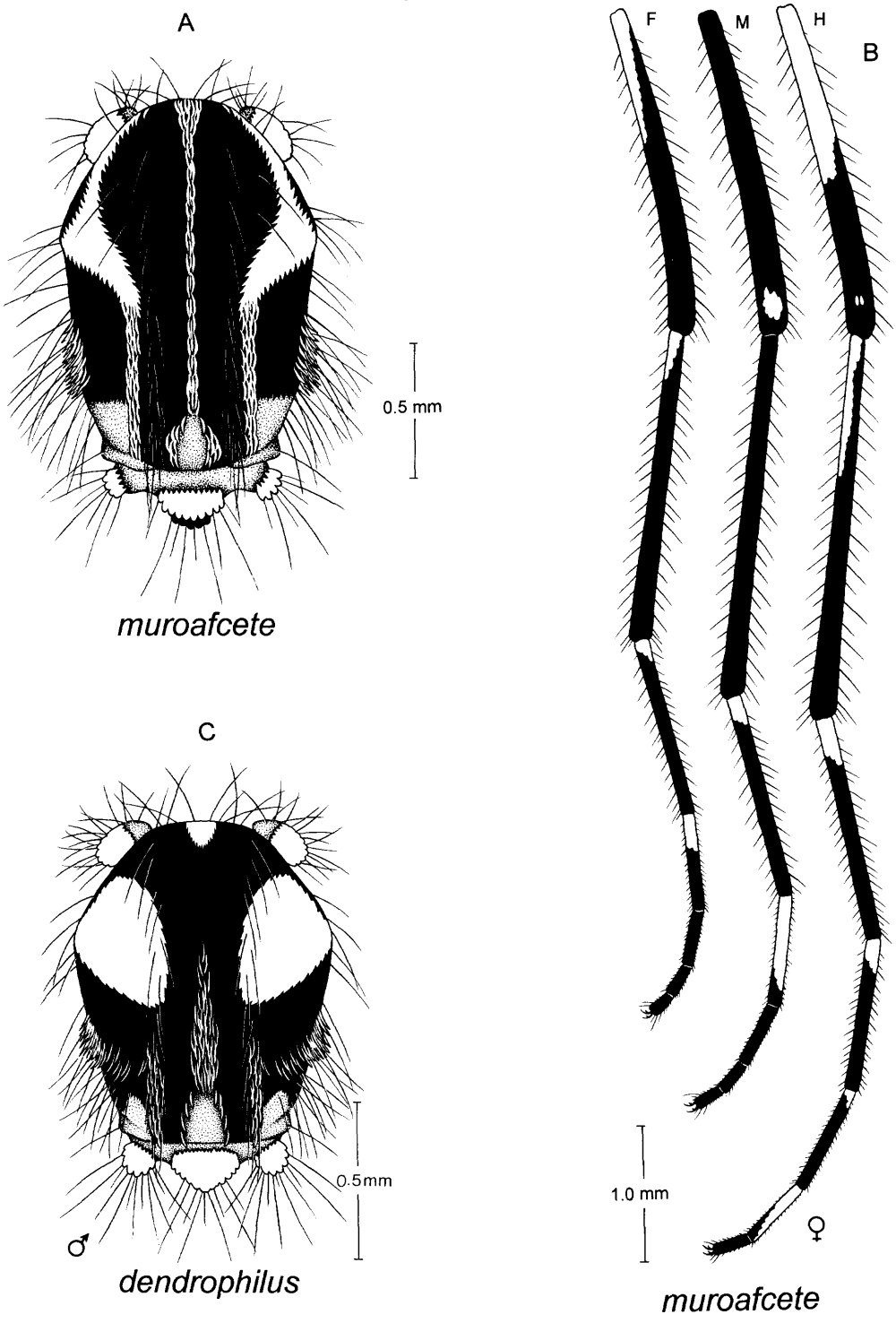
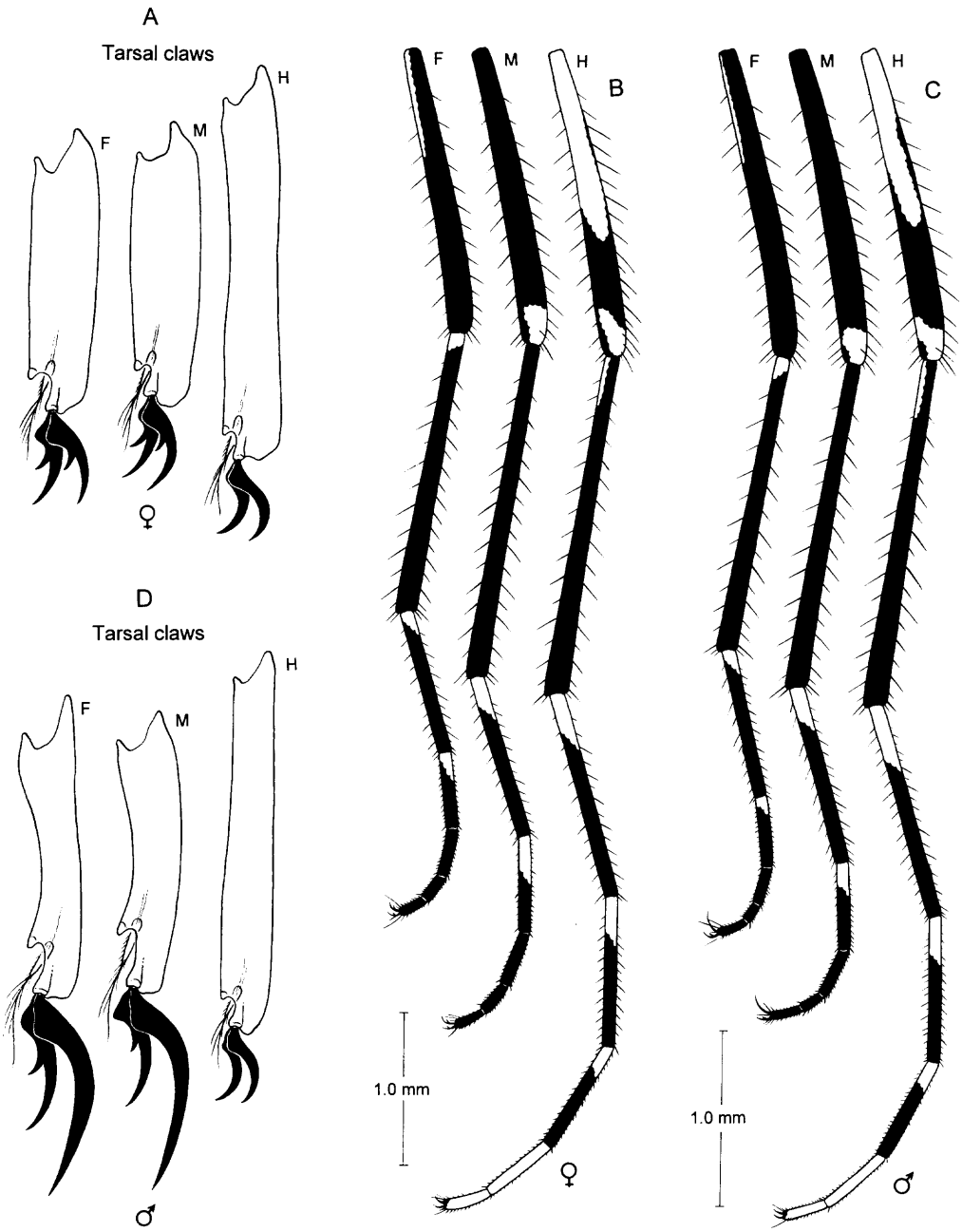
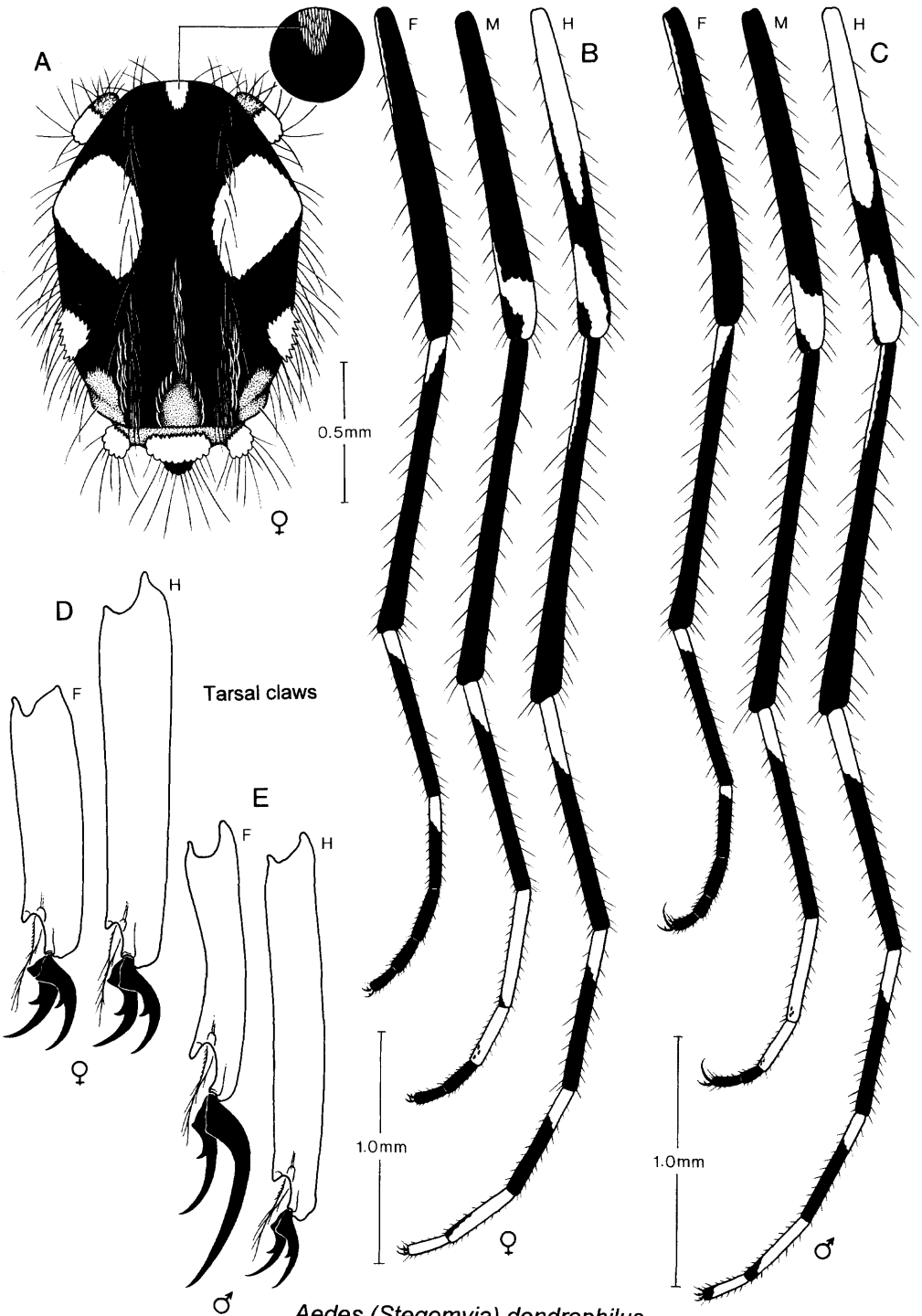

A
0.5 mm
muroafcete
C
0.5mm
♂
dendrophilus
F
M
H
B
1.0 mm
♀
muroafcete

Fig. 6



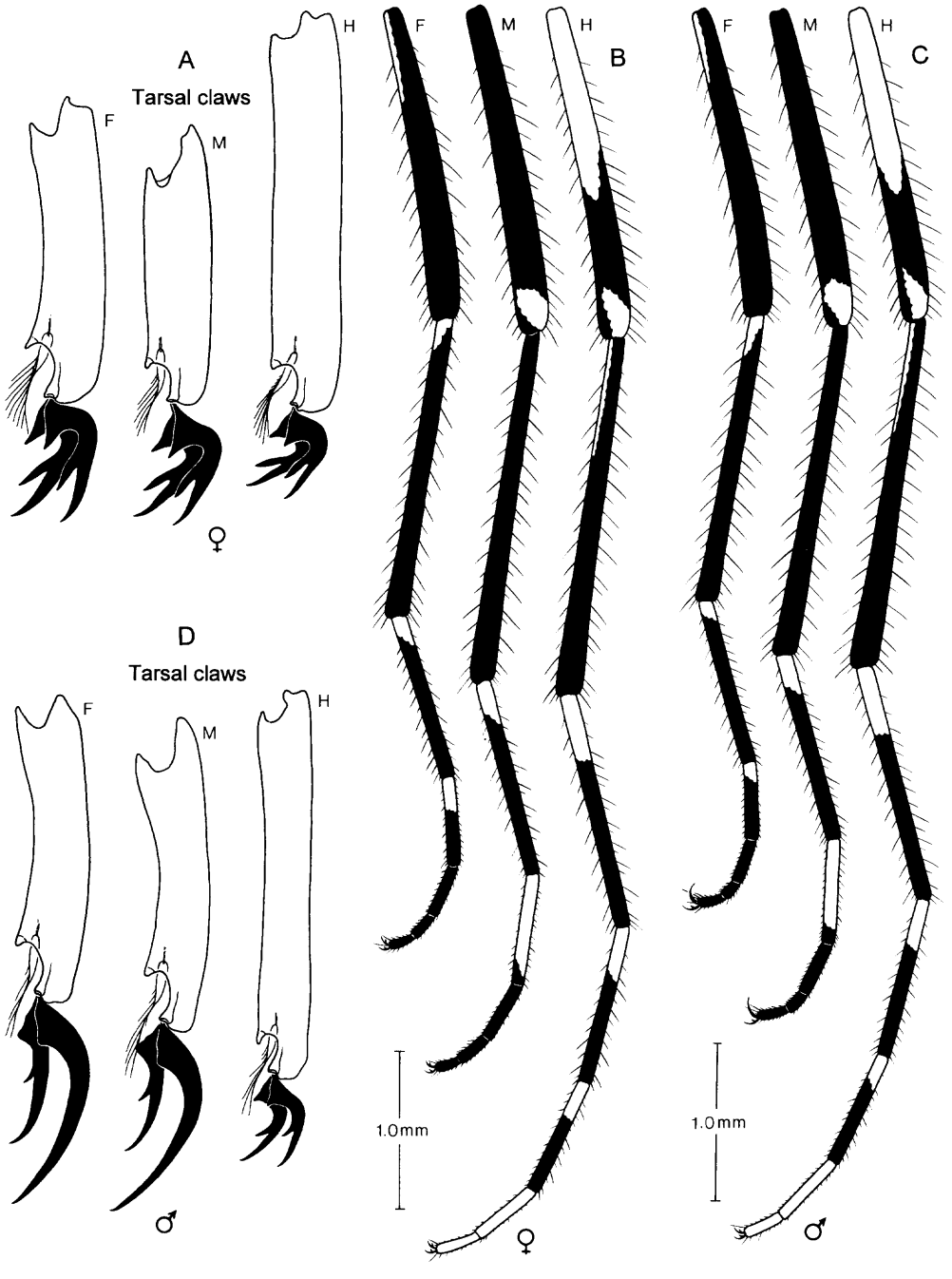
Aedes (Stegomyia) demeilloni

Fig. 7



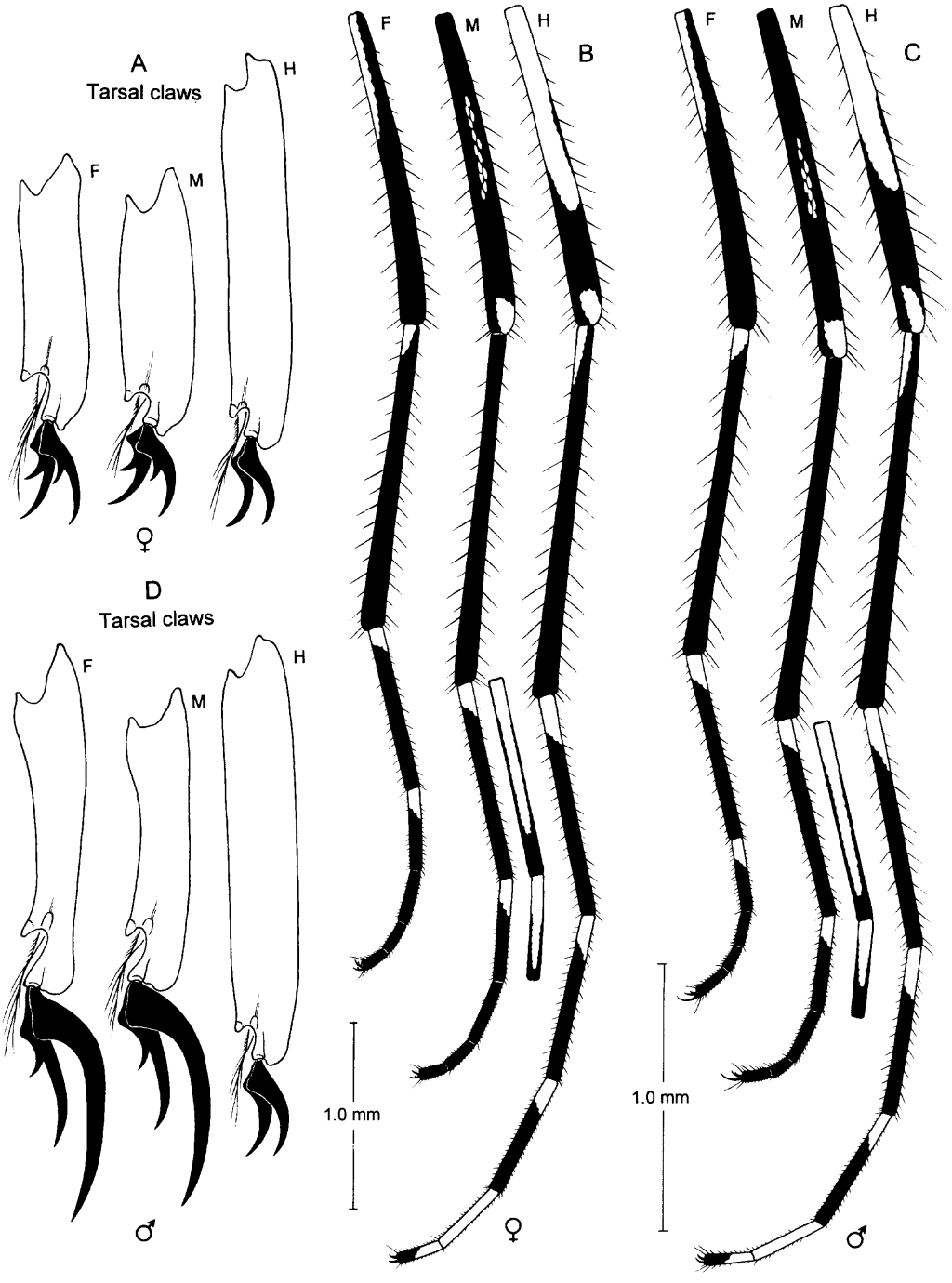
Aedes (Stegomyia) dendrophilus

Fig. 8



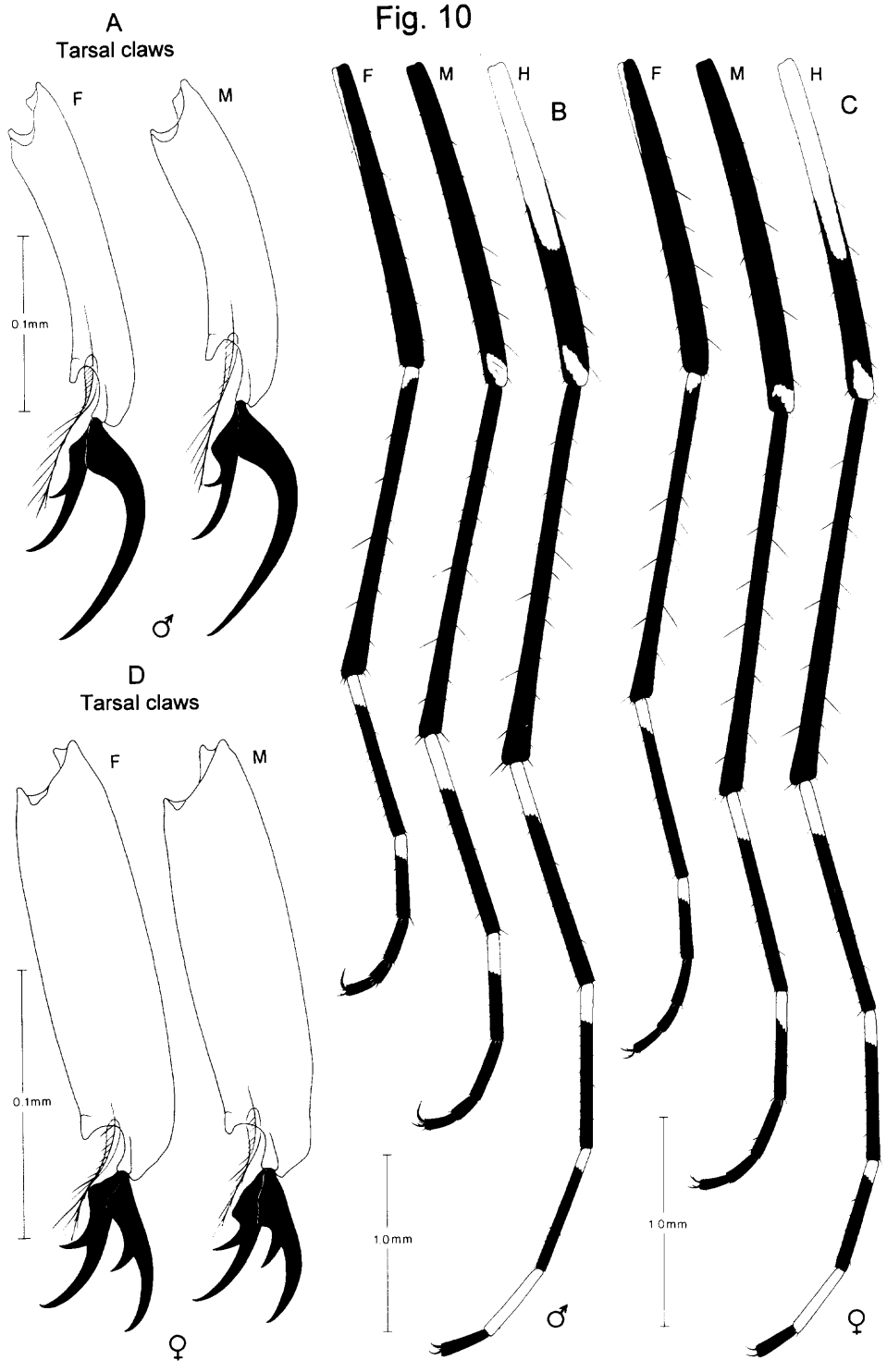
Aedes (Stegomyia) hansfordi

Fig. 9



Aedes (Stegomyia) heischi

Fig. 10



Aedes (Stegomyia) keniensis

Fig. 11

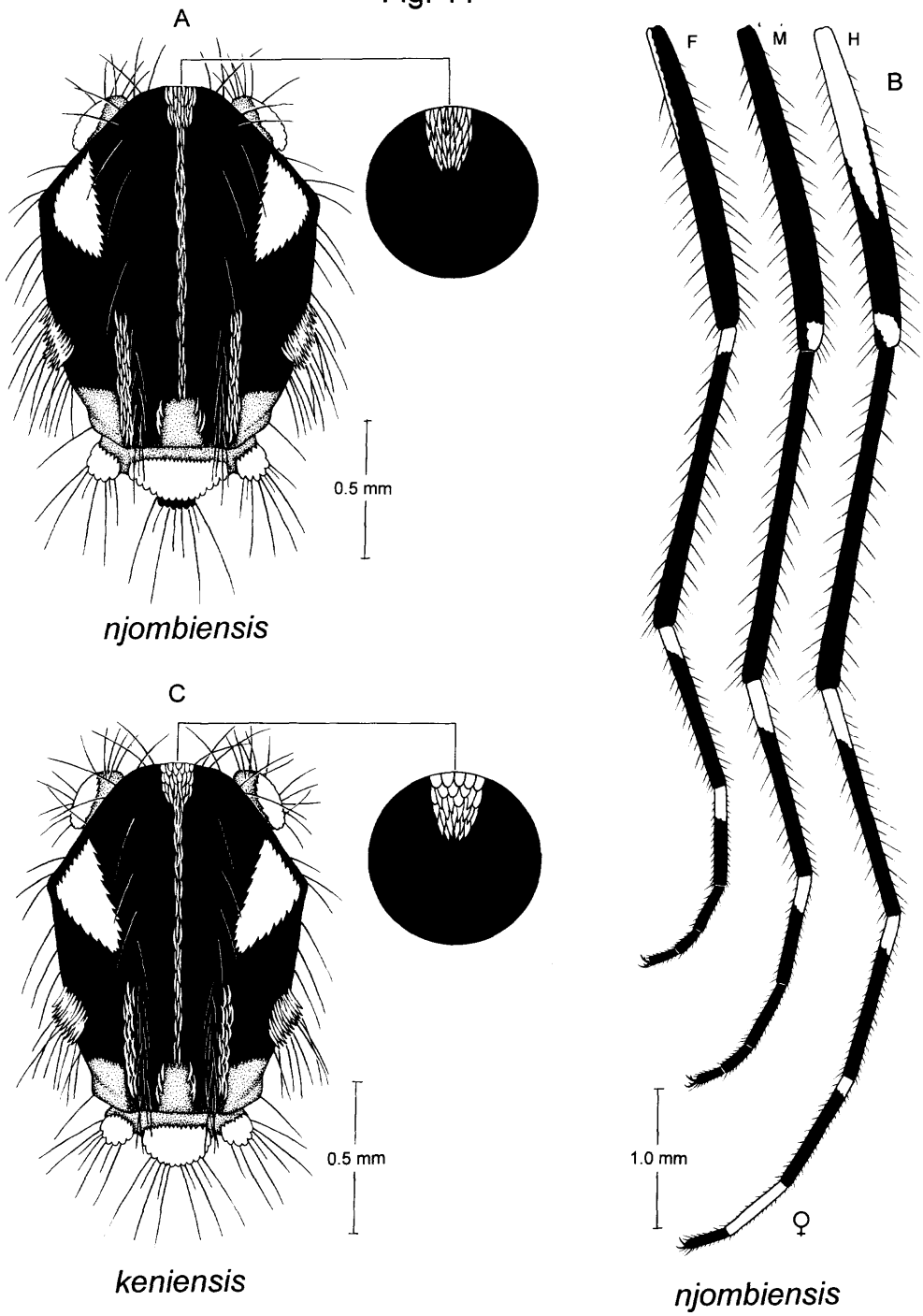
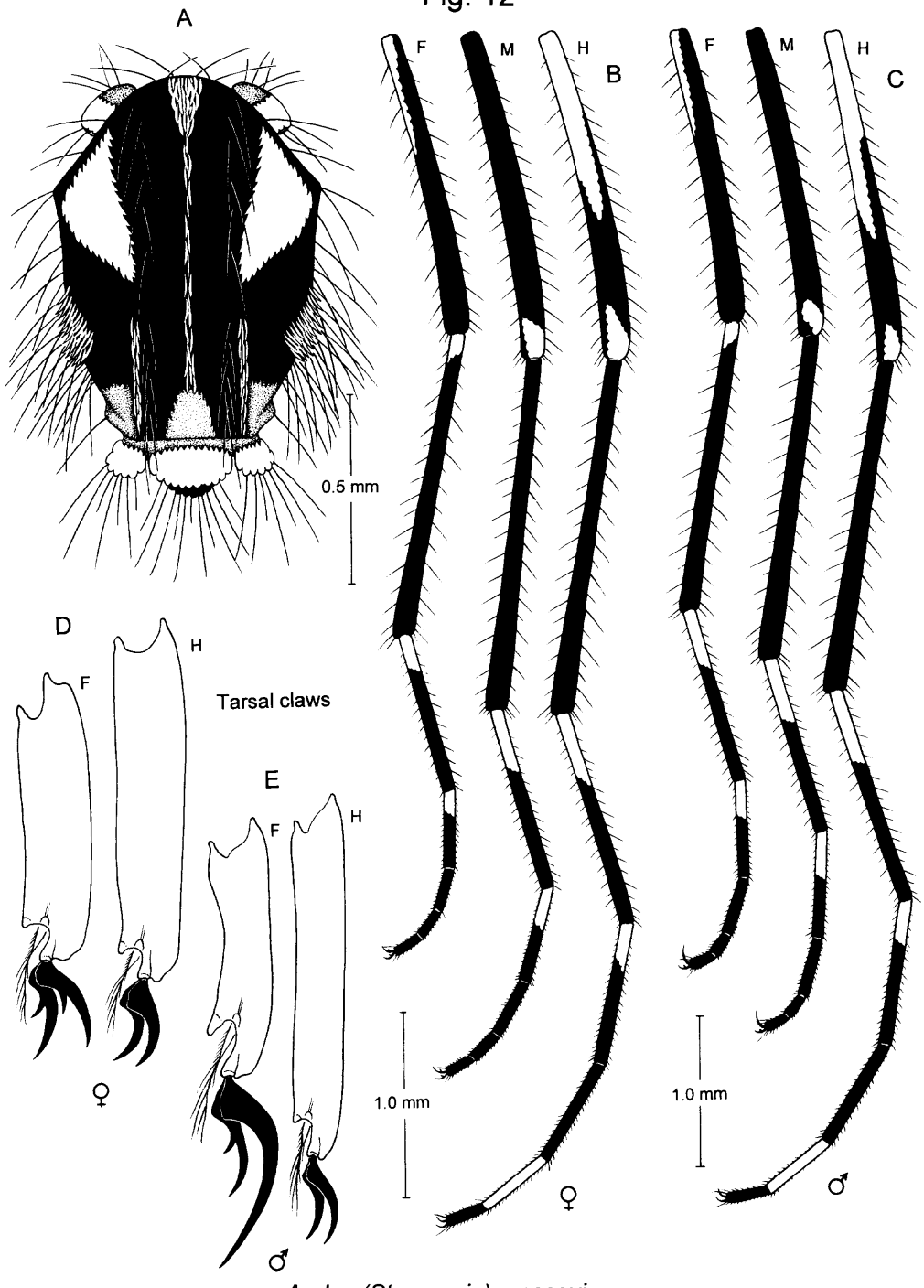
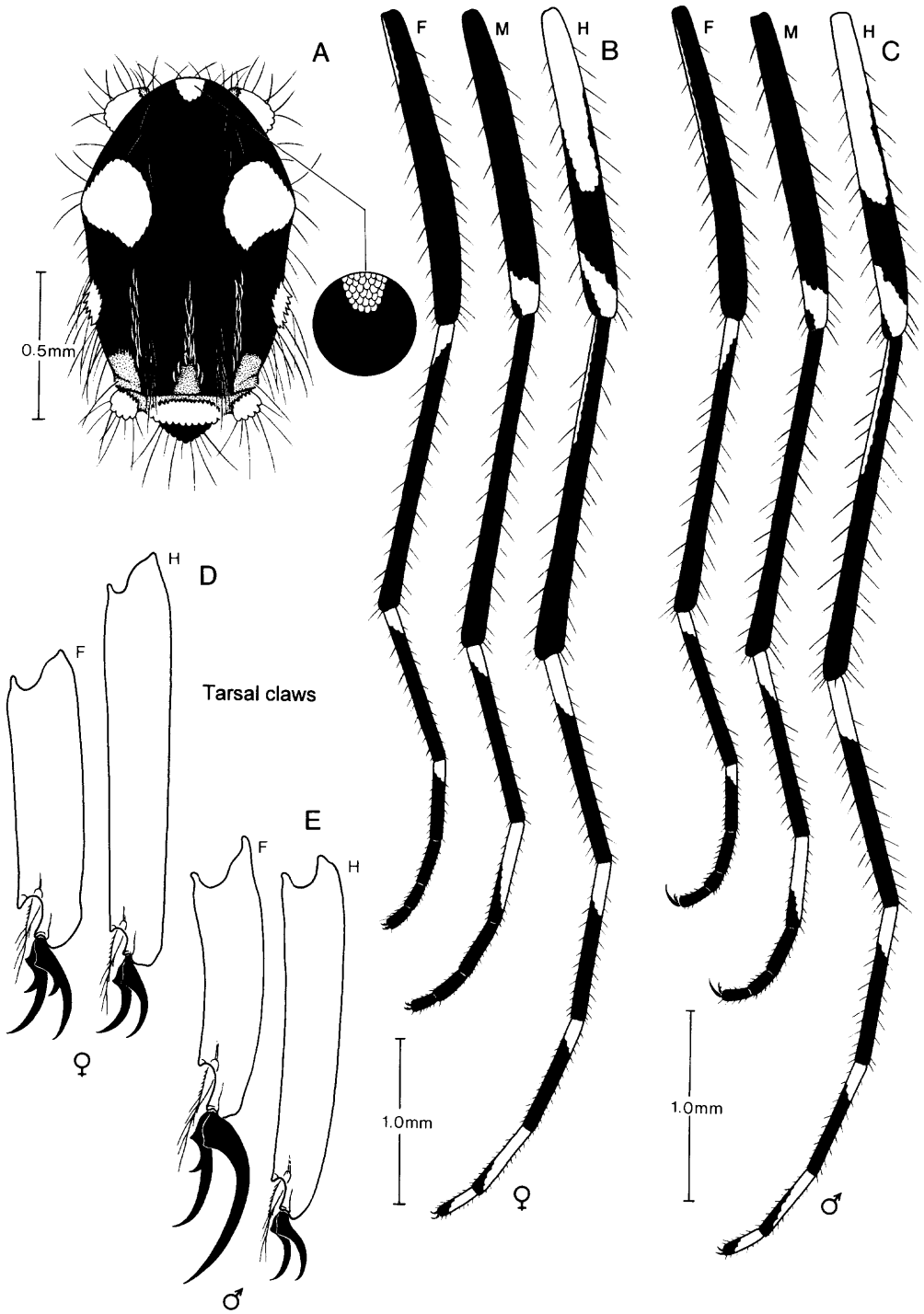


Fig. 12



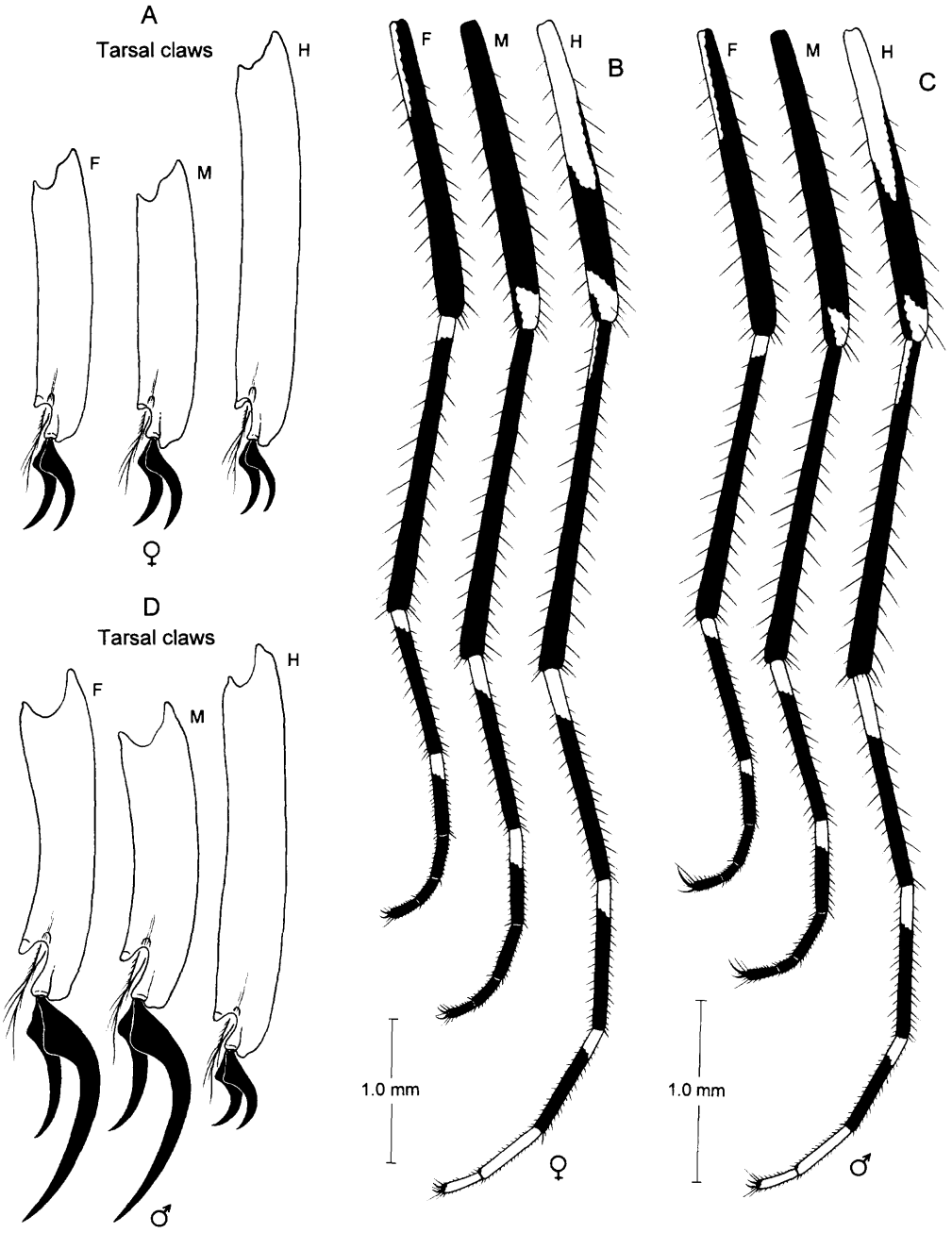
Aedes (Stegomyia) masseyi

Fig. 13



Aedes (Stegomyia) mattinglyorum

Fig. 14



Aedes (Stegomyia) segermanae

Fig. 15

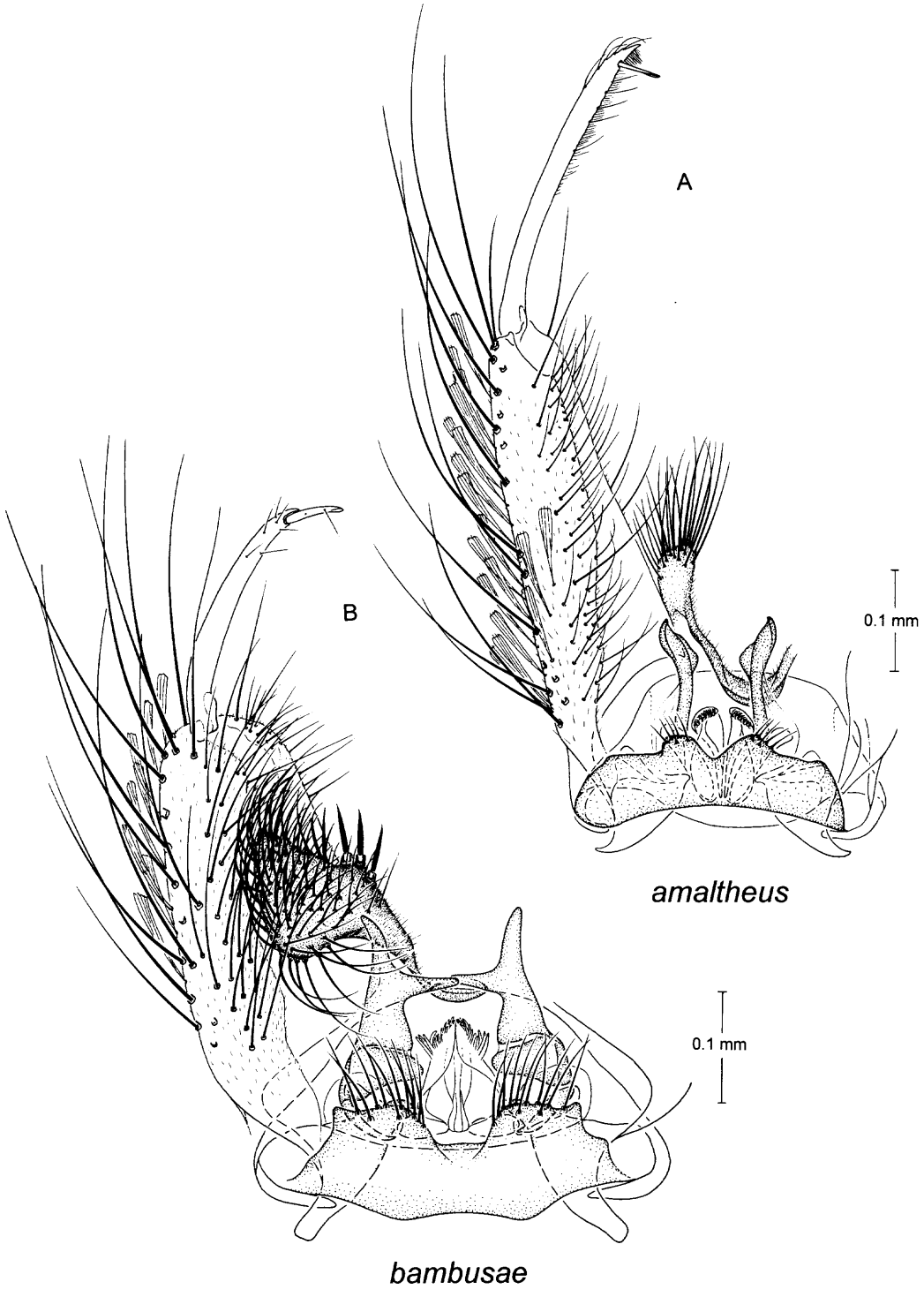


Fig. 16

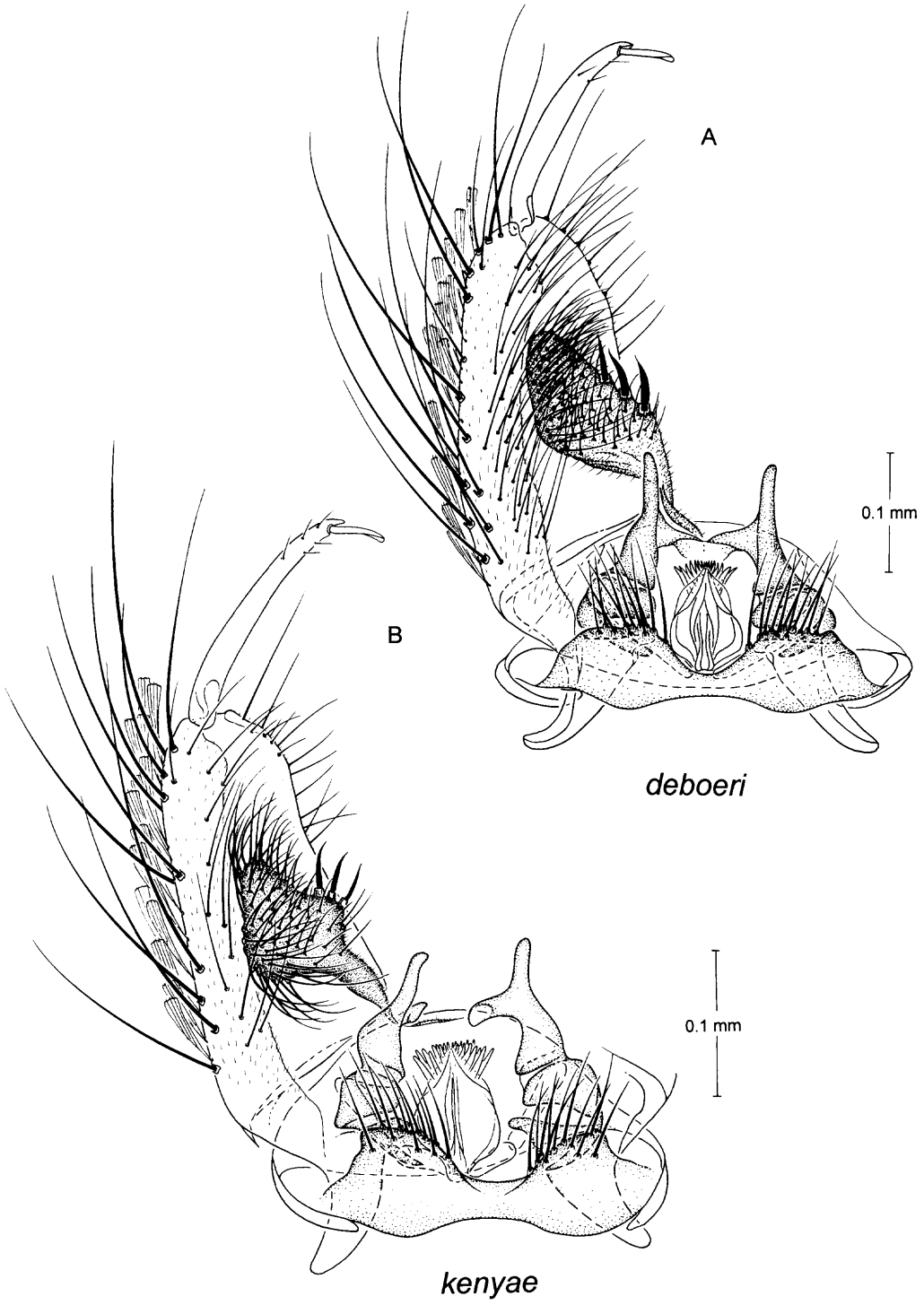


Fig. 17

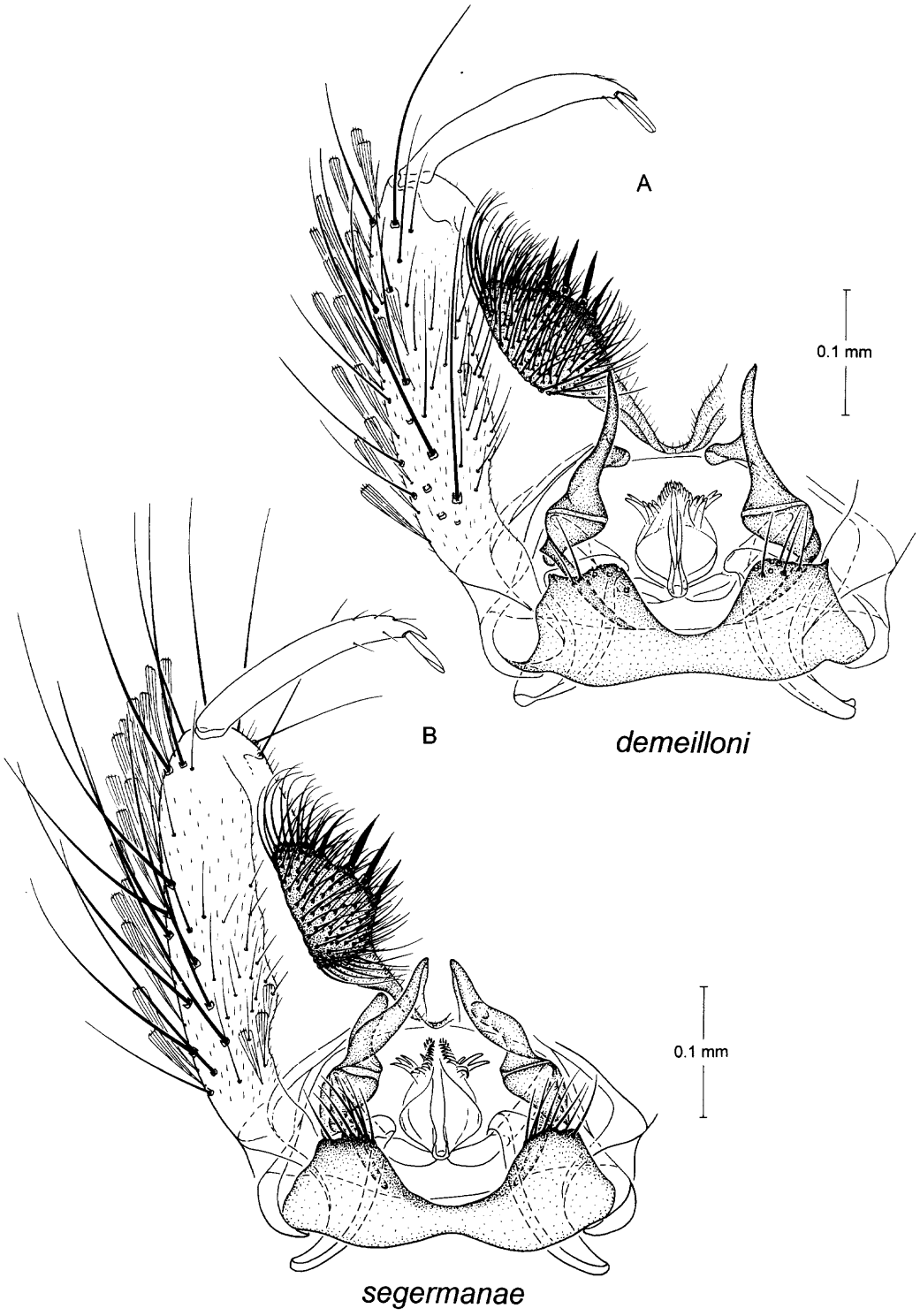


Fig. 18

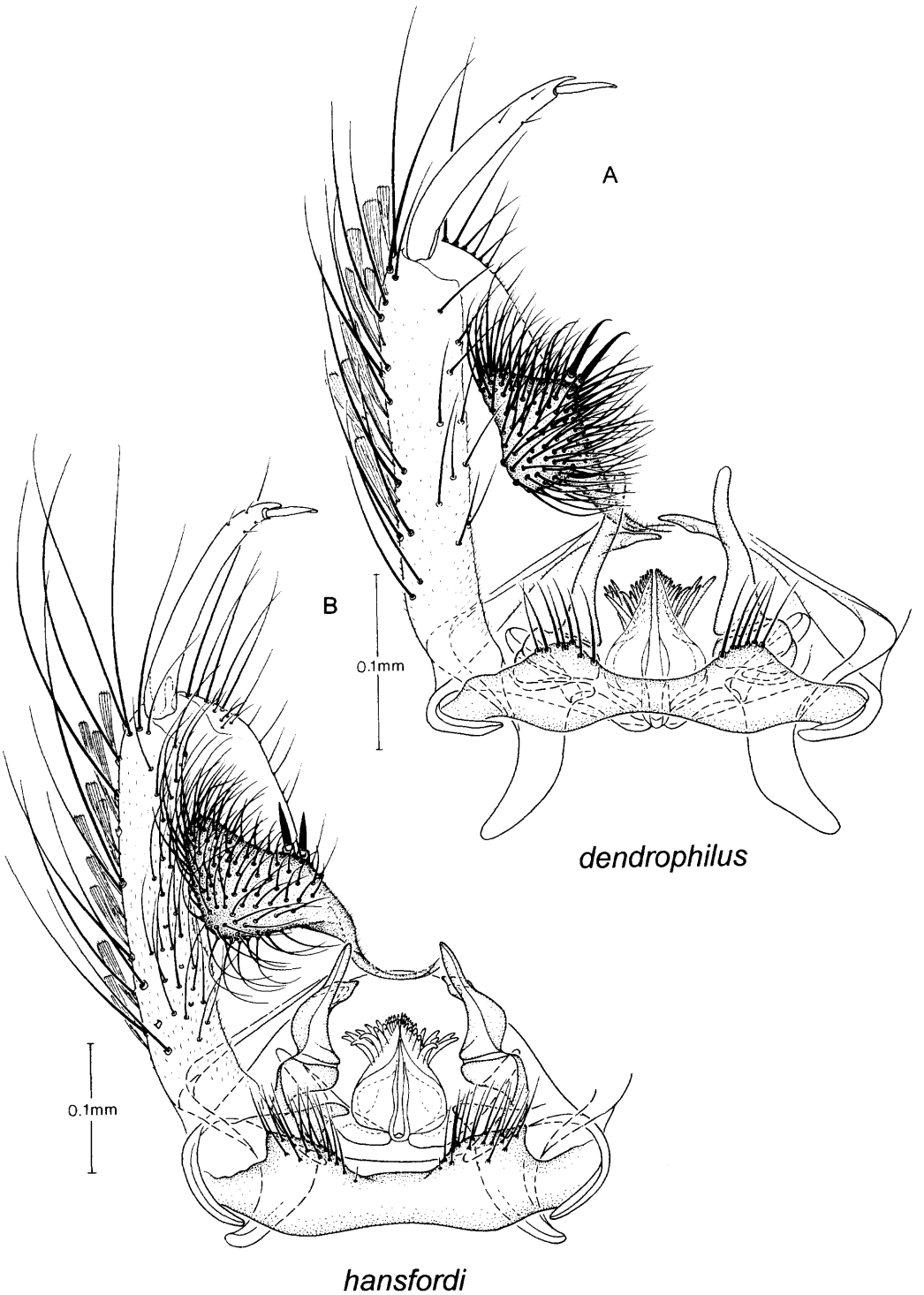


Fig. 19

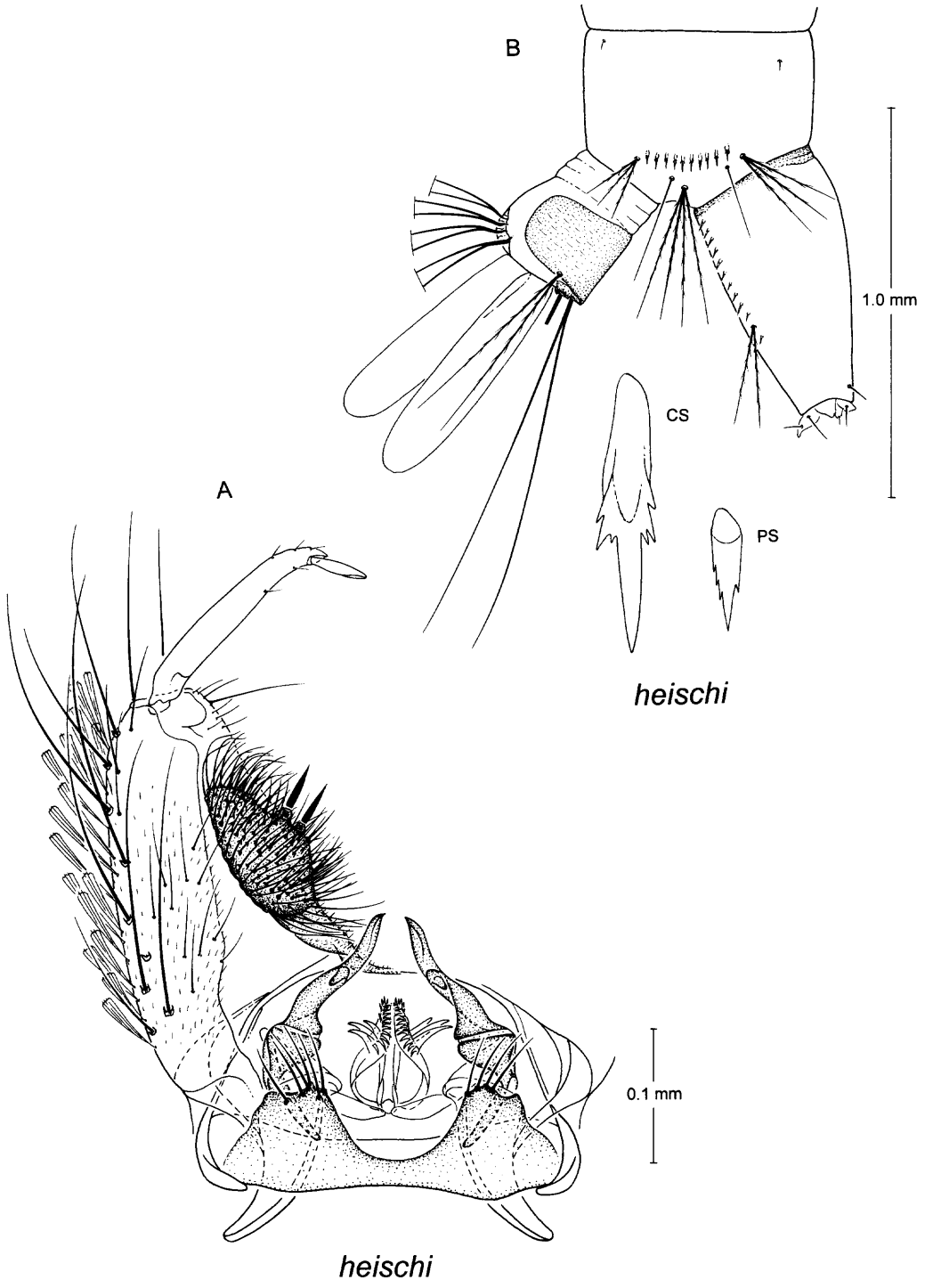


Fig. 20

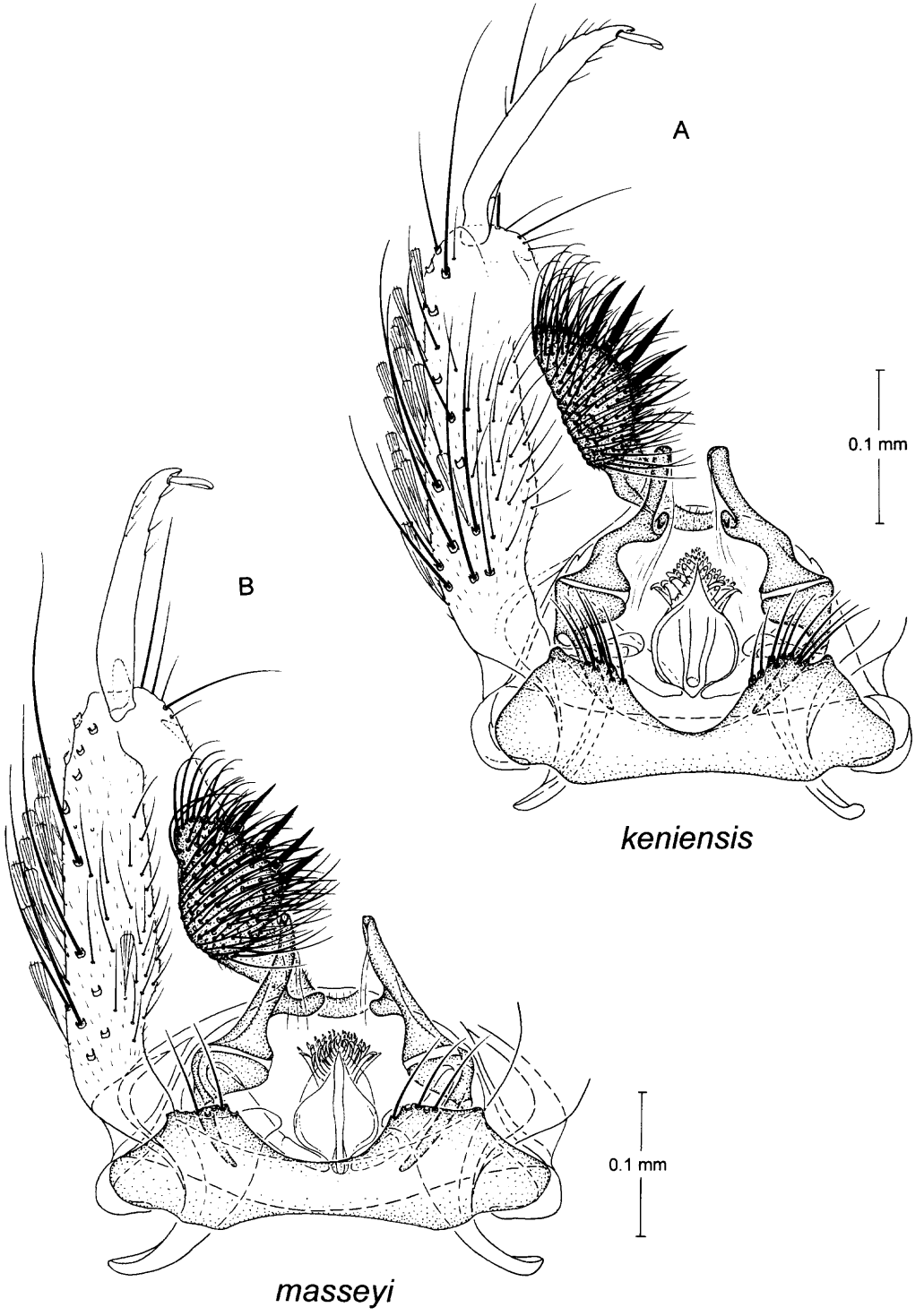
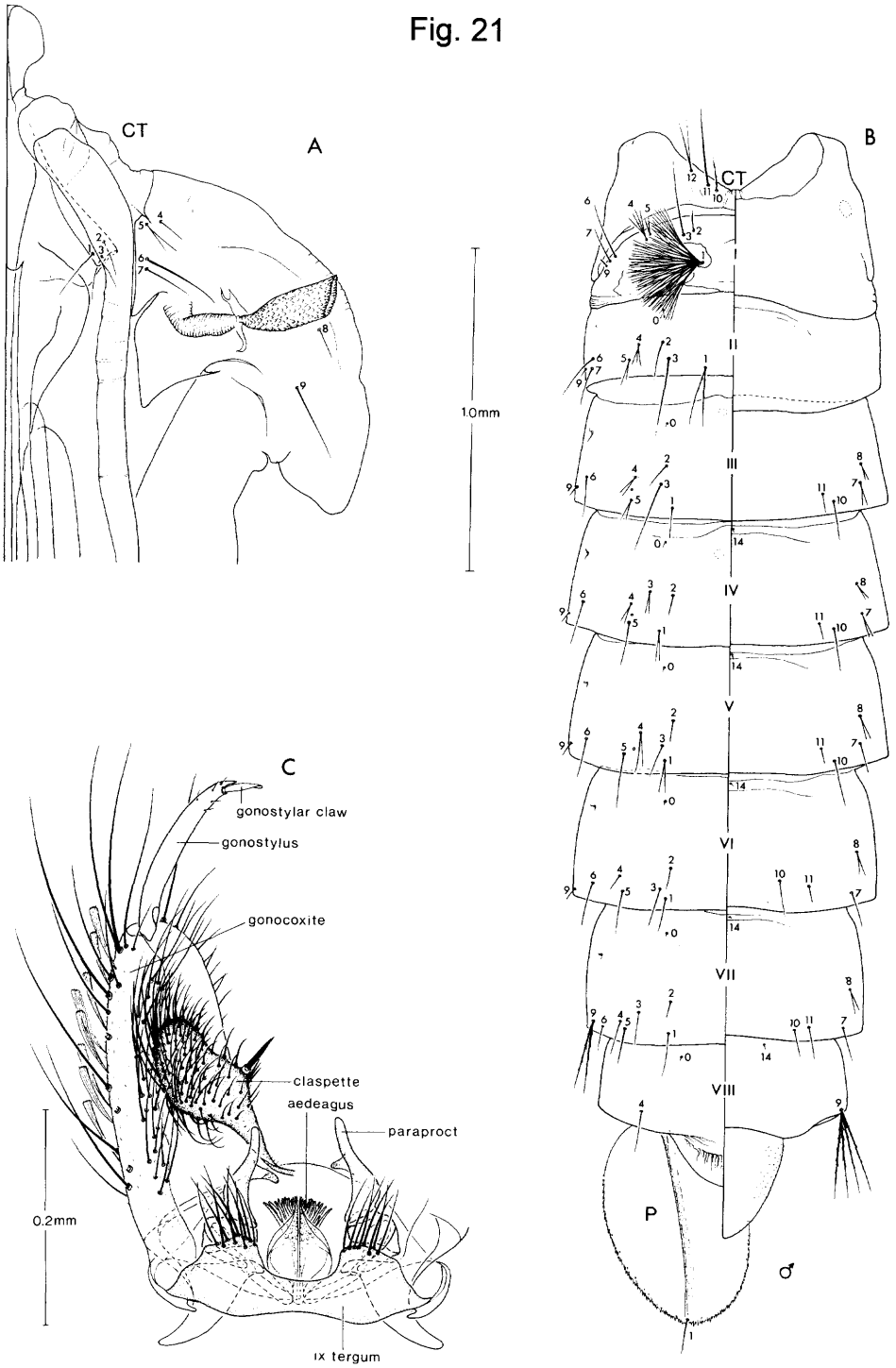
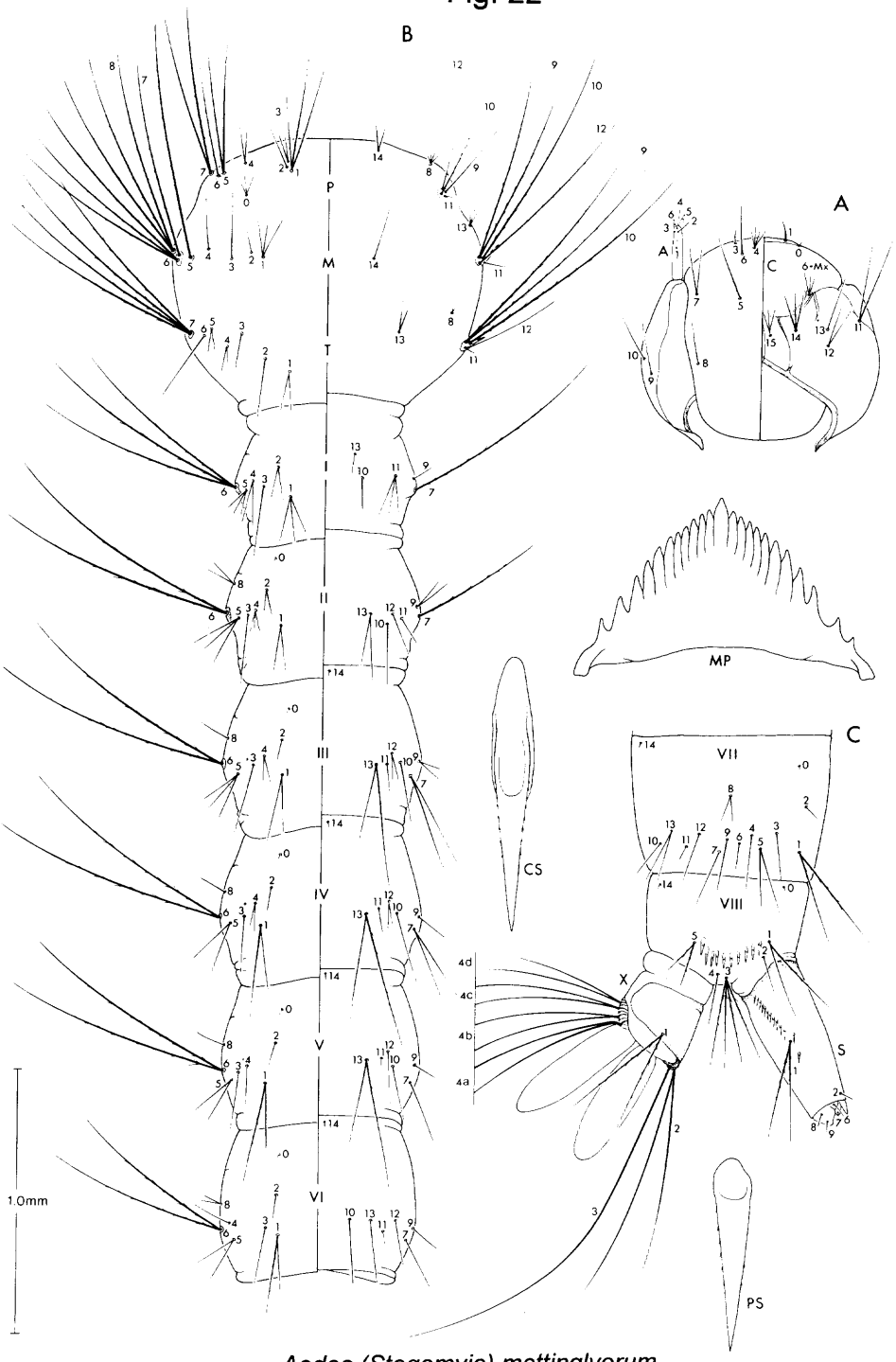


Fig. 21



Aedes (Stegomyia) mattinglyorum

Fig. 22



Aedes (Stegomyia) mattinglyorum

Fig. 23

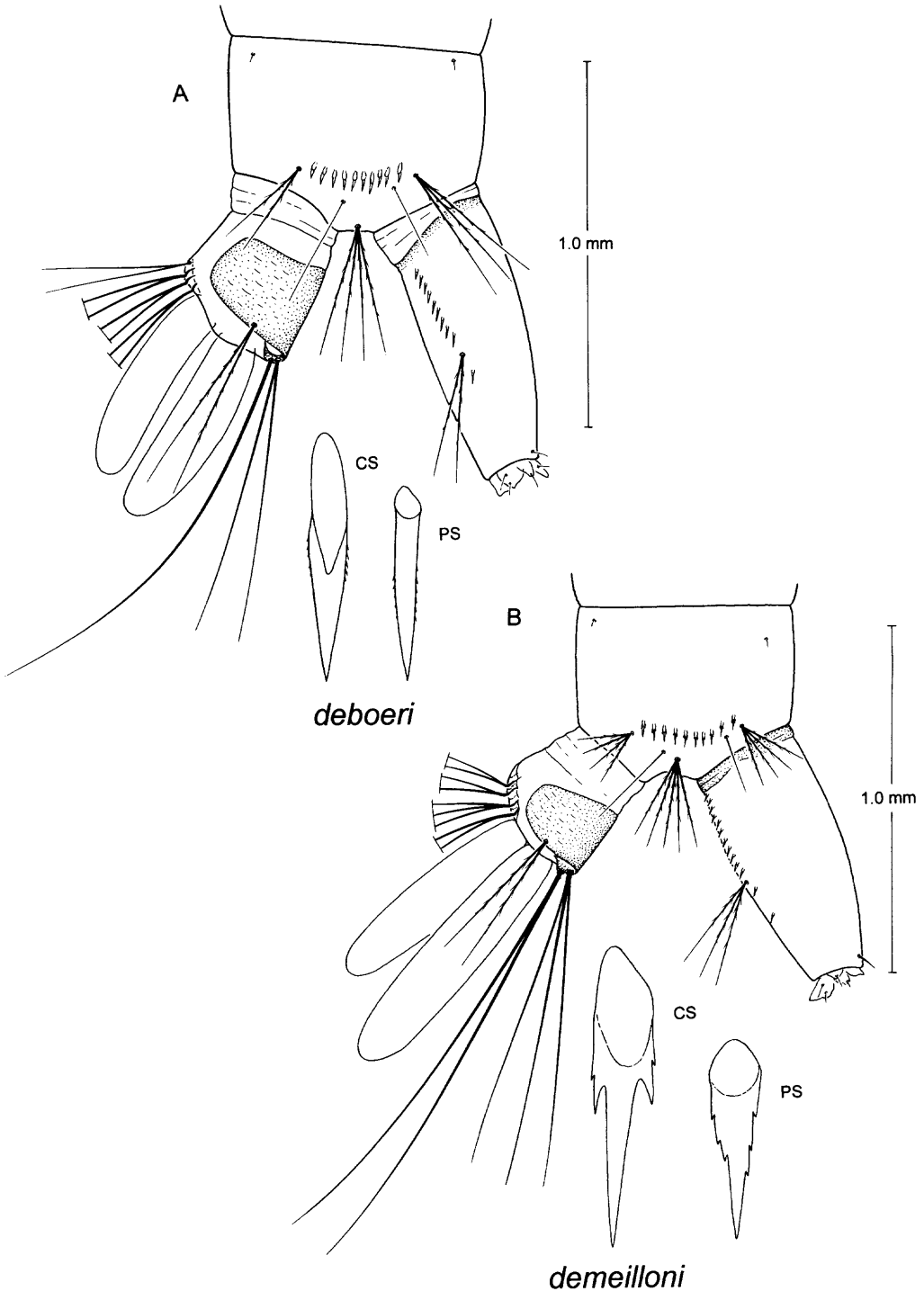


Fig. 24

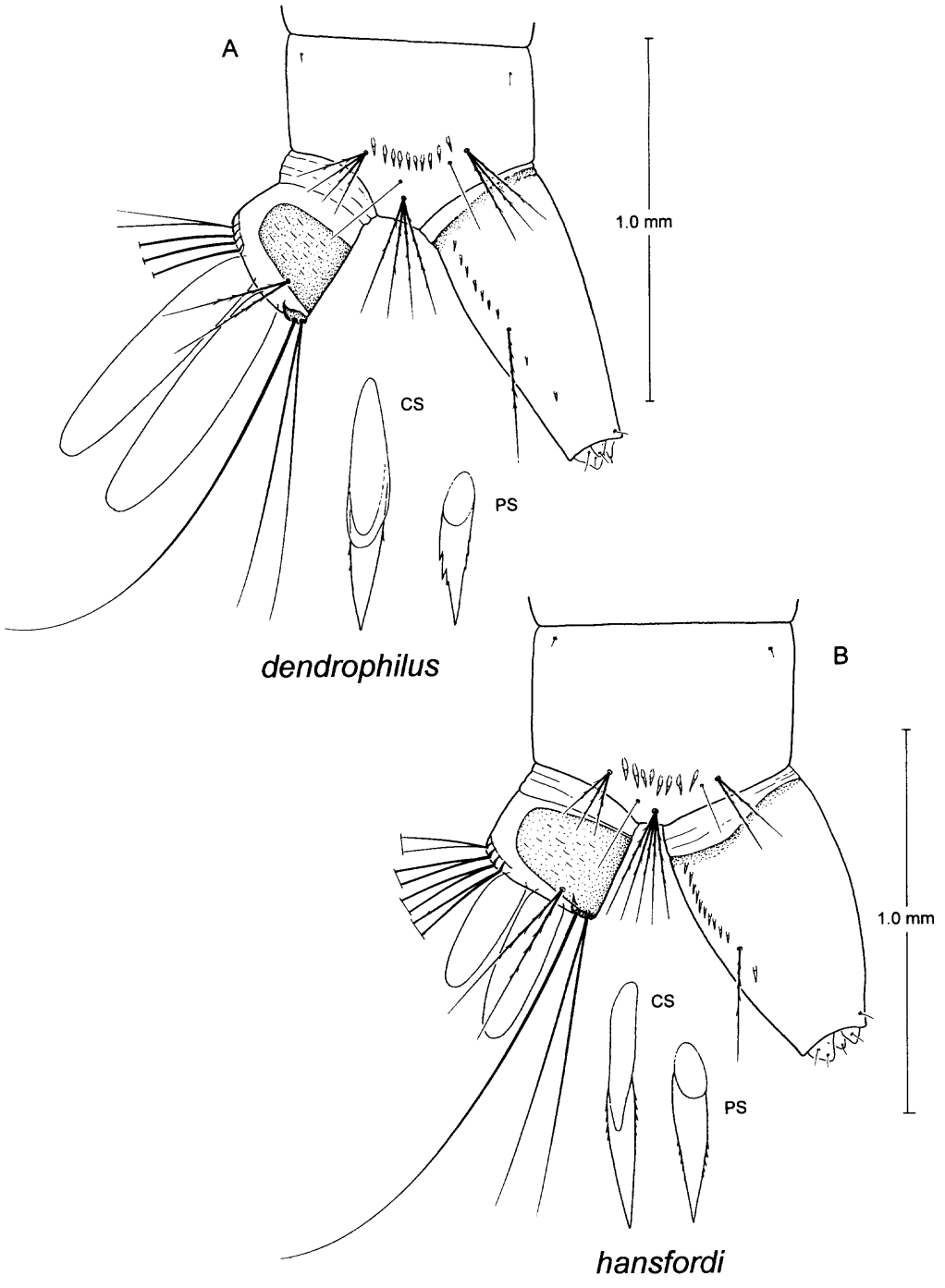
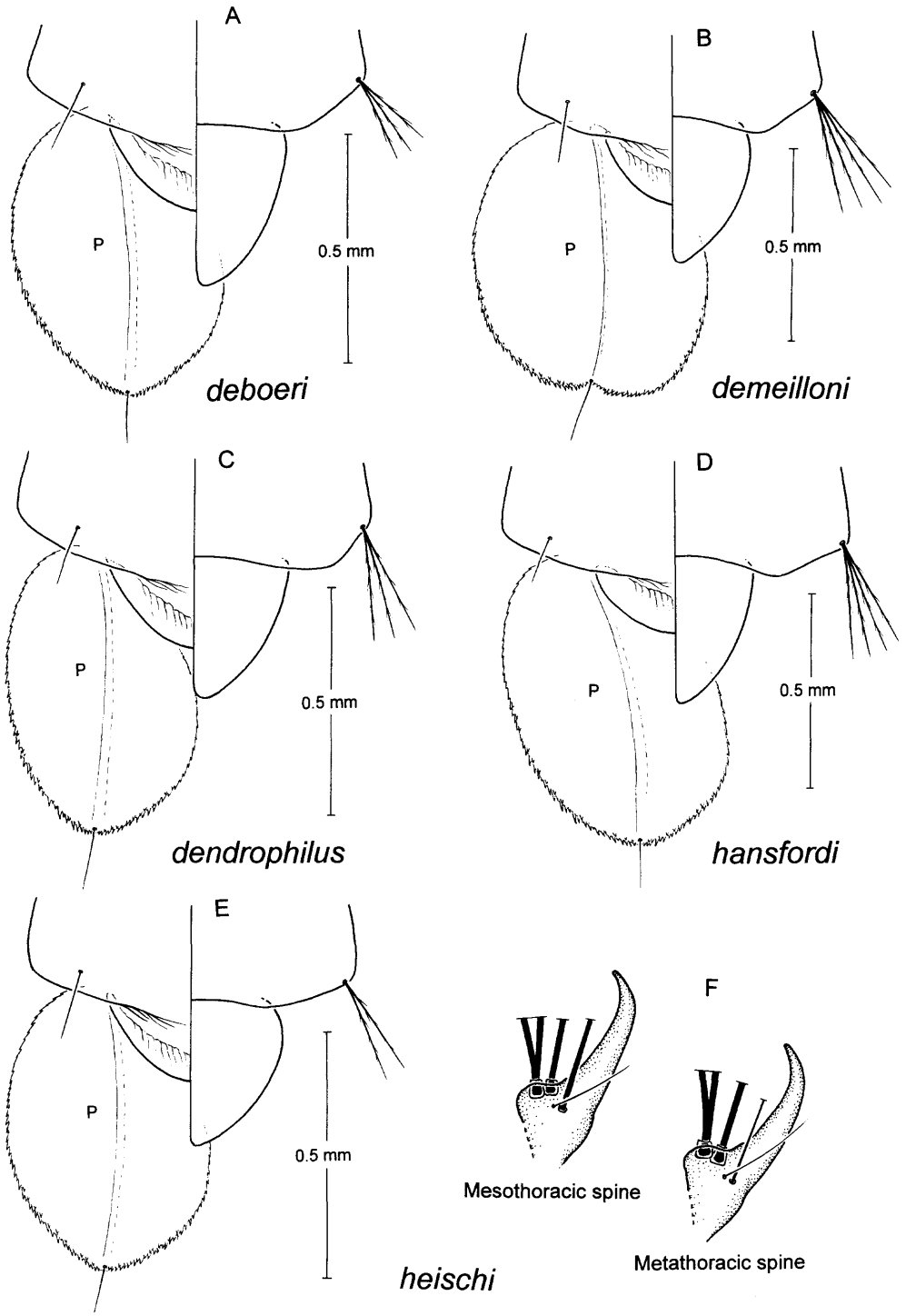


Fig. 25


A
P
0.5 mm
deboeri
B
P
0.5 mm
demeilloni
C
P
0.5 mm
dendrophilus
D
P
0.5 mm
hansfordi
E
P
0.5 mm
heischi
F
Mesothoracic spine
Metathoracic spine

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kenyae	5, 7, 8, 11k, 12k, 15k, 18, 21, 24, *44, 45, 46, 47,* 55, 66t, 68t,69t, (3, 4, 16, 70m)
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